DEPARTMENT OF THE ARMY
Omaha District, Corps of Engineers
106 South 15th Street
Omaha, Nebraska 68102-1618

:NOTICE: Failure to acknowledge : :all amendments may cause rejec- : :tion of the offer. See FAR : :52.214-3 of Section 00100 :	Solicitation No. DACA45 03 R 0041 Date of Issue: 14 JUL 2003 Date of Opening: 21 AUG 2003

Amendment No. 0002
11 AUG 2003

SUBJECT: Amendment No. 0002 to Request for Proposal Solicitation Package Design and Construction of FY 03 MAIN FIRE STATION, PN 12365, FORT CARSON, COLORADO.
Solicitation No. DACA45 03 R 0041.

TO: Prospective Bidders and Others Concerned

1. The specifications and drawings for subject project are hereby modified as follows (revise all specification indices, attachment lists, and drawing indices accordingly).

a. Specifications. (Descriptive Changes.)

(1) Section 01001, paragraph 1.1.1, page 2,
a) In the 4th subparagraph, after "3-bay fire station", add "generator building".
b) In the 4th subparagraph, correct line "a small hazardous materials and generator building;" to read "a hazardous materials and generator building, in lieu of the generator building;".

(2) Section 01002
a) Page 4, under "Attachments," after item "Plant Species List", add item: "Foundation Removal Location Plan".
b) After the attachment "Plant Species List", insert the attached "Foundation Removal Location Plan" sheet.

(3) Section 01002, Page 7, delete paragraph 1.5.1 in its entirety and substitute:

"1.5.1 Building Demolition and Removal (Option Bid Item)

The demolition and removal of Building 1518, the existing main fire station, is an Option bid item to the contract. Building 1518 is a wood structure located northwest of the new Main Fire Station location, across Prussman Boulevard, and is shown on both the attached Survey Plans and Site Plans. Building demolition shall not begin until the new Main Fire Station is substantially complete and ready to receive equipment from building 1518. GFGI equipment that is to be moved from Building 1518 to the new Main Fire Station by the Government is not salvageable to the Contractor. This shall be coordinated during design. There are two critical items to be relocated from Building 1518 to the new Main Fire Station. The existing 911 and Dispatch equipment will be relocated by the Government to the new Main Fire Station. The

logistics and timing of relocation of the 911 and Dispatch equipment shall be fully coordinated with the Contracting Officer's representative. The second critical item to be relocated is a generator located in the Building 1518, which shall be relocated by the Contractor to the new Hazardous Materials/Generator Building. The logistics and timing of relocation of the generator shall also be fully coordinated with the Contracting Officer's representative. See Section 01007 for additional electrical/communication equipment being relocated. Building 1518 demolition shall not begin until all equipment that is associated with the new Main Fire Station is removed.

Building 1518 is an approximately 160 feet by 68 feet single story wood framed structure with concrete foundation and spread footings to a depth of 4 feet with a slab on grade. The eave height is approximately 12 feet and the ridge height approximately 20 feet. Roofing material is asphalt shingles. The demolition of the building shall be complete, including removal of the building, all floor slabs, footings and foundations, utility service lines to the building, 3 wooden poles holding the existing "Harlow" antennas, and the removal of drives, walks, and stoops, planters and signage that have the sole purpose of servicing the existing fire station.

The asphalt pavement on the northeast side of the building shall be cut, full depth, at the edge of the concrete pavement, approximately eighteen feet out from the building, and a turning radius cut at the intersection with Prussman Boulevard for traffic entering the theater and post office parking lots. Access to the parking lots will be kept open at all times.

Upon completion of the removal, the site shall be fine graded for drainage and established with turf (seed). See photos on Sheet C4.01."

(4) Section 01002, page 10, delete paragraph 1.6.11 and substitute the following:

"1.6.11 Generator Building (Basic Bid Item), or Hazardous Materials (HAZMAT)/Generator Building (Option Bid Item)

A Generator Building shall be provided on a foundation. The building shall be located in the location as shown on Sheet C3.01. A concrete walk shall be provided around the building. A 6" concrete pad shall be constructed on the south side of the building in anticipation of the Users setting down portable containers to store hazardous materials. As an option bid item, a HAZMAT/Generator Building may be provided in lieu of the Generator Building. See Sheets C3.01 and C3.02. See Section 01007 for information regarding the generator and Sheet AC.01 for building footprint."

(5) Section 01332, page 11, paragraph 3.2.b (8), delete the existing paragraph and substitute the following:

"(8) SUBMITTALS. Each section of the specifications includes a submittal paragraph which lists all applicable Contractor submittals. Submittals shall be properly marked as outlined in the SpecsIntact documentation and in this

section. These codings are used for automatic generation of the Submittal Register in the SpecsIntact Software. These codings must NOT be deleted from the text, unless the submittal is not required. The Submittal Item text between the coding shall be identical (word for word, including punctuation and spacing) to the paragraph text in the reference paragraph(s). Text may be either upper or lower case letters. An example of a submittal paragraph is provided in Attachment C, "Sample Submittal Paragraph".

During this design phase, the Contractor's Designer(s) shall develop a complete list of required construction submittals in each technical specification. The list is to be used in preparing the Submittal Register for approval by the Contracting Officer Representative (COR). The example Submittal Register furnished with this Solicitation was created using SpecsIntact Software. The Contractor shall replace this example Submittal Register with the actual submittal register developed from the completed design specifications. This list is not all inclusive and additional submittals may be required as directed by the COR. Both the attached sample and the Contractor-generated submittal registers identify only the submittal section, type of submittal, description of item submitted, paragraph number related to submittal item (section submittal paragraph if none listed), submittal classification (G or FIO), and submittal reviewer identifier (DO or AO). See the below discussion on submittal classifications for additional information.

See Section 01330 SUBMITTAL PROCEDURES, for complete instructions related to submittal descriptions, classifications, numbers, and submittal process. Unless directed otherwise by the Contracting Officer, the words "Government Approval" associated with "G" designated submittals shall be interpreted as defined herein and in section 01330 SUBMITTAL PROCEDURES.

Submittal Classifications defined in Section 01330 are G-DO, G-AO, and FIO. One of these designations shall be used for all submittal requirements. For each submittal requirement in the Guide specification, designers shall indicate a submittal type (G-DO, G-AO, or FIO) or shall delete the requirement for the submittal if it is not required. The references to "G-AE" and "G-PO" submittal types in the designer notes of the technical guide specifications shall be disregarded and submittals shall be designated G-DO, G-AO, or FIO as determined by the Designer in accordance with the instructions in this section and Section 01330 SUBMITTAL PROCEDURES. There shall be no "G-AE" or "G-PO" submittals in the submittal register.

To designate a submittal item as FIO, mark the semi-colon following the submittal item and also the submittal tags up to the Item tag for deletion (i.e. "; [ ], [ ]"). Designers shall identify submittal classifications for all required submittals."

(6) Section 01007, paragraph 1.1.1, page 5, after reference for "NFPA 780", add:

"NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communication Systems, 2002."

(7) Section 01007, paragraph 1.1.9, page 7, to end of sentence "Removal of building will be complete," add "including three wooden poles holding the existing "Harlow" antennas."

(8) Section 01007, paragraph 1.5.1

a) Page 9, delete line "No other product will be acceptable".

b) Page 9, to the end of line "Provide type PMH-4 by S&C Electric Company", add "or approved equal.".
c) Page 9, delete line "The ground ring for the existing pad-mounted switch shall be connected to the new ground ring."

(9) Section 01007, paragraph 1.7.1, page 12, delete line "Area lighting control...control system."

(10) Section 01007, paragraph 1.10.5(n), page 19, after sentence "Exact location...project." add the sentence "Unit kitchenette includes two-burner cook top and under counter refrigerator, and microwave."

(11) Section 01007, paragraph 1.10.8, page 19

a) Delete lines "Provide two sets...match the dryer plug." and substitute the following:

"Provide two dryer receptacles of the voltage and amperage rating to match the dryer plugs and two residential type washer receptacle outlets in the Laundry Room."

b) Delete lines "Provide two sets of residential type washers in the Laundry Room, see Section 01006. 115, 1PH"
c) Delete line "Electric Hand Dryers...SECTION 01003."

(12) Section 01007, paragraph 1.10.10, page 20

a) Delete "Two Reach-in Refrigerators" and substitute "One Reach-In Refrigerator"
b) Delete "Two Freezers" and substitute "One Freezer"
c) Correct "Ice Making Machine" to read "Ice Making Machines"

(13) Section 01007, paragraph 1.10.13.1, page 21

a) In the 2nd paragraph, correct "HAZMAT/GENERATOR" to read "GENERATOR" in both places
b) In the 2nd paragraph, delete "(bid option)".
c) In the 3rd paragraph, delete "(bid option)".
d) In the 3rd paragraph, correct "HAZMAT/GENERATOR" to read "GENERATOR".
e) In the 3rd paragraph, delete "include...generator".

(14) Section 01007, paragraph 1.11.1, page 22

a) Under "Room Type", delete "Vending".
b) Under "Room Type", delete "Medical Storage".
c) Under "Room Type", delete "Copier Area" and substitute "Admin Support".
d) Under "Room Type", correct "Dispatch Center" to read "Dispatch/911 Center".

(15) Section 01007, paragraph 1.12, page 24, delete sentence "The demarcation points...Base Communications Contractor."

(16) Section 01007, paragraph 1.13.4,

a) Page 26, under "Telephone Outlets", delete "Breathing Apparatus Room".
b) Page 27, under "Telephone/LAN Outlets", add "Breathing Apparatus Room 1".
c) Page 27, correct "Communication Rooms 113 and 164" to read "Communication Rooms".
d) Page 27, correct "Apparatus Bays 135 & 135E" to read "Apparatus Bays".

(17) Section 01007, paragraph 1.13.5, page 27, delete sentence "See drawings for location of the blocks."

(18) Section 01007, paragraph 1.13.6, page 27, delete sentence

"Satellite dish is to be installed and provided by Others."

(19) Section 01007, paragraph 1.13.7.1, page 28, in the 3rd paragraph, the 2nd sentence, after "19" rack", add "(GFCI)".

(20) Section 01007, paragraph 1.13 "PUBLIC ADDRESS SYSTEM"

a) Page 29, correct "Corridor" to read "Corridors".

b) Page 29, correct "Vestibule" to read "Vestibules".

c) Page 29, delete excess "Corridor" and "Alcove" room types (leave one of each).

d) Page 29, correct "Storage 2" to read "Storage".

(21) Section 01007, paragraph 1.14 "SECURITY AND CLOSED-CIRCUIT TELEVISION SYSTEMS"

a) Page 30, in the 2nd sentence, delete "cipher electronic" and add "magnetic".

b) Page 30, in the 2nd sentence, delete "electric strike plate".

c) Page 30, in the sentence "The dispatch operator...the facility", delete "strike" and substitute "magnetic lock".

d) Page 30, in the sentence "Provide...strike plate", delete "and strike plate".

(22) Section 01007, paragraph 1.17.3, page 32, to the end of this paragraph add the sentence "Contractor shall use RGS and IMC for areas where conduit penetrates concrete slab per Section 16415."

(23) Section 01332, page 30, delete paragraphs 3.8(a) and 3.8(b) in their entirety, and replace them with the following:

"3.8.1 Minimization of Design Revisions

The accepted design will be used by all parties involved in construction and in administration of the contract. Therefore, it is imperative that the design documents be kept up to date and an effective system of making and distributing changes be implemented. Since changes to the design increase risk of construction errors and deplete available administrative resources, every effort shall be made to minimize revisions to the accepted design. One of the measures of the Contractor's effectiveness of management will be how well the goal of minimizing changes to the accepted design is met. The use of effective quality control during design, and utilization of experienced and capable designers are some of the means that are expected to be used to accomplish this goal.

3.8.2 Supplemental Design Package and Certification

If revisions to the accepted design (Construction Set) become necessary, the Contractor shall submit a Supplemental Design Package using Attachment B "Supplemental Design Certification and Transmittal Form" attached at the end of this specification section. This Supplemental Design Package shall be submitted as a "G-DO" construction submittal in accordance with Section 01330 SUBMITTAL PROCEDURES. The revisions will be considered a "Variation" and the list of deviations from the accepted design shall be identified on the Supplemental Design Certification and Transmittal For and on the construction submittal form ENG Form 4025-R. Variations from the Construction Set must be approved by the Contractor's Designer and Contractor's Quality Control Representative and accepted by the Contracting Officer as conforming with the RFP before construction of items affected by these revisions can commence. The Contractor shall comply with all the requirements of paragraph "VARIATIONS" of Section 01330 SUBMITTAL PROCEDURES in preparation of the Supplemental Design Package."

(24) Section 01451A

a) Page 01451A-2, delete paragraph 3.1 in its entirety and replace with the following:

"The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all design-construction and construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

The site project superintendent will be held responsible for the quality of work on the job. The site project superintendent is subject to removal by the Contracting Officer for non-compliance with the either the established quality control system or quality requirements specified in this contract. The site project superintendent in this context shall be the highest-level manager responsible for the overall construction and all construction-related activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer."

b) Page 01451A-3, paragraph 3.2.1, delete the last sentence "The staff shall...report to the project superintendent." And replace with the following:

"The staff shall include a CQC System Manager who shall report to the Project Manager or someone higher in the Contractor's organization. Project Manager in this context shall mean the individual with responsibility for the overall management of the project, including quality and production."

c) Page 01451A-5, after paragraph 3.2.2 (3), add the following:

"(4) The DQC Manager shall report to the overall Project Manager of the contractor for the design-build contract. The Project Manager will be held responsible for the quality of design on the contract and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract."

d) Page 01451-6, paragraph 3.4.1, in the first sentence, delete the words "safety and"; delete line "The Safety and Health Manager...member of the CQC staff."
e) Page 01451A-6, paragraph 3.4.3, delete line "A Design Quality Control Manager...Contractor's Quality Control staff."
f) Page 01451A-6, paragraph 3.4.3, add the following line to the end of the paragraph:

"The Contractor shall identify a separate Design Quality Control Manager, who is a Registered Architect or Professional Engineer. This DQC Manager is considered to be part of the Contractor's Quality Control staff but shall report directly to the overall Project Manager for the Contractor for the design-build contract."

b. Specifications (New and/or Revised and Reissued). Delete and substitute or add specification pages as noted below. The substituted pages are revised and reissued with this amendment.

Pages Deleted	Pages Substituted or Added
Section 01003	Section 01003
Section 01006	Section 01006
Section 01330	Section 01330
01332-32, 01332-33	01332-32, 01332-33

c. Drawings (Reissued). The following drawings are revised with latest revision date of 11 August 2003, and reissued with this amendment.

(1) Sheet A1.01,
(2) Sheet A1.02,
(3) Sheet A1.03,
(4) Sheet A4.01,
(5) Sheet AC.01,
(6) Sheet C3.01,
(7) Sheet C3.03,
(8) Sheet EU.01,
(9) Sheet IC.01,
(10) Sheet U1.01.

d. Amendments. (Descriptive changes)

(1) Amendment #1, page 1, delete paragraph 1.a.(3) in its entirety.
(2) Amendment #1, page 2, delete paragraph 1.b and 1.b.(1) in their entirety.

2. This amendment is a part of the bidding papers and its receipt shall be acknowledged on the Standard Form 1442. All other conditions and requirements of the specifications remain unchanged. If the bids have been mailed prior to receiving this amendment, you will notify the office where bids are opened, in the specified manner, immediately of its receipt and of any changes in your bid occasioned thereby.

a. Hand-Carried Bids shall be delivered to the U.S. Army Corps of Engineers, Omaha District, Contracting Division (Room 301), 106 South 15th Street, Omaha, Nebraska 68102-1618.

b. Mailed Bids shall be addressed as noted in Item 8 on Page 00010-1 of Standard Form 1442.

3. Offers will be received until 1400 hours, local time at place of receiving proposals, 21 AUG 2003.

Attachments:
"Foundation Removal Location" sketch listed in 1.a above.
Specification sections listed in 1.b above.
Drawings listed in 1.c above.

U.S. Army Engineer District, Omaha
Corps of Engineers
106 South 15th Street

Omaha, Nebraska 68102-1618

11 AUG 2003
JDW/4529

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01003

ARCHITECTURAL BUILDING REQUIREMENTS

1.6.1.19 Function/Activity: Conference Room Storage #109, Storage #114, Storage # 140, Storage #134, and Storage #1666
1.6.1.20 Function/Activity: Break Area #111
1.6.1.21 Function/Activity: Administrative Support #110
1.6.1.22 Function/Activity: Display Area #105
1.6.1.23 Function/Activity: Dorm Rooms #115, #135, #138, #139, #141, #142, #143, #144, #145, #146, #147, #160, and #1611
1.6.1.24 Function/Activity: Toilet #116
1.6.1.25 Function/Activity: Fire Chief Office #117
1.6.1.26 Function/Activity: Shift Leader Office #118
1.6.1.27 Function/Activity: Fire Inspector's Suite #120
1.6.1.28 Function/Activity: Chief Fire Inspector's Office #121
1.6.1.29 Function/Activity: Storage #122 and #123 (For Fire Inspector's Suite)
1.6.1.30 Function/Activity: Vestibules #154 and #157
1.6.1.31 Function/Activity: Apparatus Bays #170 A through E
1.6.1.32 Function/Activity: Storage Room #173
1.6.1.33 Function/Activity: Disinfection/EMS Decontamination Room #172
1.6.1.34 Function/Activity: Fire Gear Cleaning #174
1.6.1.35 Function/Activity: Wet/Dry Chemical Fire Extinguisher Room #171
1.6.1.36 Function/Activity: Breathing Apparatus Room #175
1.6.1.37 Function/Activity: Men's Shower/Locker Room #152
1.6.1.38 Function/Activity: Men's Sinks #150
1.6.1.39 Function/Activity: Men's Toilet #151
1.6.1.40 Function/Activity: Women's Toilet #148
1.6.1.41 Function/Activity: Women's Shower #149
1.6.1.42 Function/Activity: Laundry Room #155
1.6.1.43 Function/Activity: Library/Crew Meeting #164
1.6.1.44 Function/Activity: Captain's Office #159
1.6.1.45 Function/Activity: Physical Training #162
1.6.1.46 Function/Activity: Day Room #163
1.6.1.47 Function/Activity: Dining Room #165
1.6.1.48 Function/Activity: Kitchen #167
1.6.1.49 Function/Activity: Refrigerator/Freezer Room #168
1.6.1.50 Function/Activity: Pantry #169
1.6.1.51 Function/Activity: Mechanical Room 176, Electrical and UPS Room 177
1.6.1.52 Function/Activity: Patio
1.6.1.53 Mechanical Courtyard
1.6.1.54 Function/Activity: HAZMAT Storage/Generator Building, Generator Room, Room #001 (Basic)
1.6.1.55 Function/Activity: HAZMAT Storage/Generator Building, HAZMAT Storage, Room #002 (Bid Option)
1.6.2 Occupational Safety and Health
1.6.3 Handicapped Accessibility
1.6.4 Interior Sound and Vibration Control
1.6.5 Physical Security
1.6.6 Composition of Masses and Spaces and Architectural Details to Reflect the Desired Image, and the Scale and Nature of the Activities Involvedd
1.6.7 Economy of Building Construction, Operation, and Maintenance: Life-Cycle Cost Effectiveness
1.6.7.1 Economy
1.6.7.2 Operations and Maintenance
1.7 TECHNICAL REQUIREMENTS
1.7.1 Miscellaneous Metals
1.7.1.1 Steel Pipe Handrails & Guardrails

1.7.1.2 Access Doors and Panels
1.7.1.3 Miscellaneous
1.7.1.4 Sun Screens
1.7.2 Finish Carpentry
1.7.3 Roof Design
1.7.3.1 Standing Seam Metal Roofing System
1.7.3.2 Modified Bitumen Roofing
1.7.3.3 Roof Insulation
1.7.3.4 Roof Ventilators
1.7.4 Exterior Insulation and Finish System (Not Used)
1.7.5 Factory Insulated (Foamed in Place) Pre-Finished Flush Metal Siding Wall Panels
1.7.6 Sheet Metalwork, General
1.7.7 Doors
1.7.7.1 Steel Doors and Frames
1.7.7.2 Aluminum Doors and Frames
1.7.7.3 Wood Doors
1.7.7.4 Sectional Overhead Doors and Overhead Rolling Doors
1.7.7.5 Metal Rolling Counter Doors and Fire Shutters
1.7.7.6 Special Doors
1.7.8 Hardware; Builder's (General Purpose)
1.7.8.1 Hinges
1.7.8.2 Locks and Latchsets
1.7.8.3 Lock Cylinders
1.7.8.4 Lock Trim
1.7.9 Keying
1.7.10 Door Closing Devices
1.7.11 Auxiliary Hardware
1.7.12 Finishes
1.7.13 Door Hardware
1.7.13.1 Hardware Requirements
1.7.13.2 Hardware Sets
1.7.14 Key Storage System (Cabinet)
1.7.15 Not Used
1.7.16 Aluminum Window Frames and Entrances
1.7.17 Aluminum Storefront/Window Wall as applicable
1.7.18 Interior Windows
1.7.19 Glass and Glazing
1.7.19.1 Insulated Laminated Glass
1.7.19.2 Insulated Laminated Glass- Low-E Unit
1.7.19.3 Glass Mirrors
1.7.19.4 Laminate Glass
1.7.19.5 Bullet Resistant Glass
1.7.20 Gypsum Wallboard and Steel Studs
1.7.21 Tile
1.7.22 Ceilings
1.7.22.1 Gypsum Board Ceiling
1.7.22.2 Acoustical Tile Ceiling
1.7.23 Painting, General
1.7.23.1 Surfaces to Receive Stain or Paint
1.7.23.2 Surfaces Not to be Painted
1.7.24 Metal Lockers
1.7.25 Exterior Signage
1.7.26 Toilet Accessories
1.7.26.1 Accessory Types
1.7.26.2 Toilet Accessory Finishes
1.7.26.3 Miscellaneous Accessories
1.7.26.4 Toilet Accessories Requirements
1.7.27 Fire Extinguishers and Cabinets

SECTION 01003

ARCHITECTURAL BUILDING REQUIREMENTS

PART 1 ARCHITECTURAL BUILDING REQUIREMENTS

1.1 FUNCTIONAL PLAN REQUIREMENTS

The facility design is based upon English measuring units. All dimensions shown on Architectural sheets are indicated in feet and inch units. The overall design and configuration can be slightly altered as long as each individual room area is not reduced and the overall building area is not changed. The areas shown on the drawings for the individual rooms is the minimum area to be provided for that room. Design alterations will be allowed as required for material modular sizing considerations, economy of detail connections, access for utilities, exiting, and handicap provisions.

It is important that the functional integrity of the floor plan be maintained. Any changes that the Contractor proposes to the RFP documents shall be submitted to the government for approval.

The architectural component of the project is a 14,816 square feet basic (16,986 square feet with options) single story facility. The final facility design and exterior features of the facility will reflect the furnished drawings and technical requirements outlined in the RFP and shall conform to the Fort Carson Installation Design Guide. The contractor shall update all room names and numbers on all drawings and schedules as appropriate.

This facility will include the following Common Support, Administrative, and Operations areas.

The layout of the mechanical, electrical and communication spaces are suggestive and may require wall configurations to be slightly altered to conform with equipment requirements. It shall be the responsibility of the contractor to verify that there is adequate space in rooms, chases, and above ceilings for all mechanical, electrical, and communication equipment and that coordination for this equipment installation and function occurs.

All attempts shall be made to locate structural columns within walls, except in the Apparatus Bays. The Apparatus Bays shall be clear span and columns will not be permitted within the bays, but only at the permitter walls. Structural elements such as rigid frames that affect the function and impede on the usable space and volume of any room shall not be permitted. Column locations shall be approved by the Government. In-wall columns shall be concealed where ever possible. In-wall columns and pilaster protrusions (including finishes) shall be limited to 6-inches. These column locations however, shall be coordinated fully with equipment, specialties, furniture, and systems furniture layouts so as not to impact the function of such items.

Fire separation walls and egress capacities from the facility shall meet or exceed the requirements of NFPA 101 - Life Safety Code, and UFC 3-600-01 - Fire Protection for Facilities. UFC 3-600-01 shall have precedence over

all other fire codes. This facility will be completely fire sprinklered as part of the requirement. The facility shall have a complete fire code analysis by a fire protection engineer to determine the location of all fire rated walls, ceilings, and doors.

Provisions in the design and construction of the facility shall be made to accommodate building movement and expansion both during construction of the facility and after the facility is completed and occupied. With the large floor and roof areas for this project, structural steel and roof framing shall accommodate differential movement from expansion and contraction due to temperature differentials that will occur throughout the day and seasonally, without damage to adjacent areas, and connections to structural and masonry or concrete, and other building elements.

1.2 DESIGN CRITERIA

The technical specifications provided shall serve as the minimum design standards established for this project. Design publications listed in each specification section shall be used as sources of criteria for design. The criteria from these sources may be supplemented, but not supplanted, by applicable criteria contained in nationally recognized codes, standards, and specifications. The floor plan shall meet the needs of the building users, and as such, no function shall be changed or removed from the design without approval of the building users.

References in the following specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number shall be regarded as establishing a standard of quality and not be construed as limiting competition.

1.2.1 TECHNICAL SPECIFICATIONS

The government-provided technical guide specifications shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for this facility.

The provided specifications define the minimum requirements and level of quality for items of equipment, materials, installation, and testing that shall be provided for the facility. Where items of equipment, materials, installation, or testing requirements are not covered in the provided specifications, special sectionsor paragraphs, shall be added within each guide specification, or new specifications sections shall be prepared to cover those subjects.

1.2.2 PUBLICATIONS

The design publications listed below shall be used as sources of criteria for the architectural design. The most current edition of the code or standard shall be used as criteria for the design. The criteria from these sources may be supplemented but not supplanted, by applicable criteria contained in nationally recognized codes, and standards.

1.2.2.1 National Fire Protection Association

Life Safety Code 101, most current edition (See SECTION 01008 - Fire Protection Requirements)

Installation, Maintenance, and Use of Fire Service Communications Systems 1221, 2002 Edition

1.2.2.2 International Conference of Building Officials

International Building Code (2000 Edition)

1.2.2.3 Military Handbooks

MIL HDBK 1190 - Facility Planning and Design Guide, Dated 1 September 1987

1.2.2.4 American with Disabilities Act (ADA)

Accessibility Guidelines for Buildings and Facilities (July 1, 1994)

Uniform Federal Accessibility Standards (UFAS) (Latest Edition)

1.2.2.5 Design Charrette Documentation

FY-03 Congressional Add, P.N. 12365 Main Fire Station, Fort Carson, Colorado

1.2.2.6 Occupational Safety and Health (O.S.H.A.) Standards

1.2.2.7 Installation Design Guide for Fort Carson, CO, September 2002.

1.2.2.8 Unified Facilities Criteria (UFC)

UFC-4-010-01, Draft, 12 July 2002, DOD Minimum Antiterrorism Standards for Buildings

UFC 3-600-01 - Fire Protection for Facilities (April 2003)

1.3 DESIRED IMAGE AND ARCHITECTURAL COMPATIBILITY

The Proposer shall verify all existing conditions and dimensions during design and prior to construction.

The building shall fit the site and be compatible with the surrounding environment. Building facades and elevations shall match the appearance to the enclosed elevation drawings. Slight alterations will be allowed as required for material modular sizing as approved by the Government.

1.4 THE TYPE OF ACTIVITIES AND EQUIPMENT INVOLVED

The major functional activities of building are as follows:

Common Support, Administrative, and Operations areas:

The Common Support and public area is defined by the entrance canopy (basic) and entry tower and roof elements (option). Common support areas include the Main entry, Vestibules, Waiting area, Break Area with kitchenette, Display Area, Conference Room with provisions for a training classroom and testing, Storage, Electrical/UPS rooms, Communications Rooms, Mechanical rooms, Corridors, Janitor Closet, and Hazardous Materials/Generator Storage building (Generator portion is basic, HAZMAT portion is a bid option).

Administrative rooms and areas includes a wide variety of spaces necessary for the operation of the facility. Spaces include the Secretary/

Receptionist, 911 Supervisor and Dispatch/911 Center offices, Dispatch/911 Communications room, Dispatch/911 Toilet, Chief Fire Inspector, Fire Inspector office Suite, Fire Chief Office, Shift Leaders Office, Fire Chief/Shift Leader Dorm Room and Toilet, Administrative Support (copier/office supplies) Area, and Public Toilets.

Operations areas include the Apparatus Bays which is a higher roofed area with an option for a clerestory/roof monitor. Vehicles parked in the Apparatus Bays are critical to the overall mission and operations but are not in continuous operation. The vehicle Apparatus Bays shall be used for storage of vehicles and could involve daily minor types of repair and inspections, but will not include labor intensive types of vehicle repairs. Also included are the Breathing Apparatus Recharging Room, Fire Gear Cleaning Room, Disinfection/EMS/Decontamination Room, Wet and Dry Chemical Fire Extinguisher Room, and Storage Rooms.

Operations area support spaces for personnel include Dorm Rooms, Toilets, Shower/Locker Rooms, Captains Offices, Captain's Dorms, Physical Training Kitchen, Dining Room, Refrigerator/Freezer Room, Pantry, Library/Crew Meeting Room, Day Room, and Laundry room. An exterior vehicle wash rack will be provided at the rear of the facility. A Patio and Mechanical Courtyard will also be included.

Additional description of the individual spaces within these three major groups are further defined within this Section.

1.5 TYPE AND METHOD OF CONSTRUCTION

1.5.1 Facility Construction

The facility shall be designed as permanent construction. The definition of permanent construction per MIL HDBK 1190: Buildings and facilities designed and constructed to serve a life expectancy of more than 25 years, shall be energy efficient, and must have finishes, materials, and systems selected for low maintenance and low life-cycle cost.

Types and methods of construction are limited to the criteria established herein and shall meet all governing codes.

Wood construction shall not be permitted.

All concrete masonry units and/or concrete walls used in the buildings shall be developed on a standard masonry module. Standardization of masonry wall design shall be developed which result in as few cut blocks as possible. Masonry structural properties shall comply with requirements outlined in Section 01005 STRUCTURAL REQUIREMENTS.

Walls, windows, floors,and roofing systems shall be permanently constructed and attached to each other. All construction shall be done in a workman like manner, properly installed in accordance with manufacturer's recommendations and finished.

Construction and methods, materials, systems, etc. shall be of a quality that requires little or no maintenance. The Contractor shall not change the exterior material selection and colors indicated. Materials have been selected to be durable, low maintenance and economical and reflect the level of quality required for this facility and area of the Post.

1.5.2 Exterior Walls and Finish Materials

Exterior walls and finish materials shall be selected on the basis of architectural compatibility and appearance in accordance with the design provided. The outside or exposed face of the exterior walls shall be composed of integrally colored concrete masonry units, integrally colored split face concrete masonry units, and integrally colored 1/2 scored concrete masonry units, or burnished concrete masonry units, and cast stone trim and banding (as indicated on the drawings). A unique color, style and/or shape of concrete masonry units (different than the remainder of the building) shall be provided at the main entrance/canopy/tower segment of the building and all other personnel entrances as shown on the drawings.

Exterior walls of the building can be a masonry cavity wall system consisting of 4-inch concrete masonry units on the exterior, a minimum 1-inch air space, 2-inch minimum cavity wall insulation, and a minimum 8-inch concrete masonry unit interior wythe. This will provide a durable interior surface for the abuse that may occur in the apparatus bays and adjacent shop and storage environments.

Other exterior walls at administrative, sleeping, or living areas where shop environments do not occur can be a masonry cavity wall as described above, with with a gypsum wallboard interior finish.

A masonry veneer system for the non apparatus bay and shop portions of the building (administrative, sleeping, or living areas where shop environments do not occur) can be considered where a hard, durable, and impact resistant interior material is not necessary. This can consist of non-load bearing 4-inch nominal split face or other concrete masonry units, a 2-inch air space, an air barrier, 1-inch insulating sheathing to minimize thermal bridging, sheathing (cementitious type board instead of gypsum board, 4-inch steel studs, fiberglass insulation meeting the specified R-value, vapor retarder membrane, and a 5/8-inch interior layer of gypsum wallboard.

The Generator portion (Basic) and the Hazmat portion (Bid Option) of the Hazmat/Generator Building shall have exterior walls where the base is identical in appearance to that of the Main Fire Station. The upper portion of the walls can be integrally colored concrete masonry units or preinsulated metal wall panels where the color is identical to the concrete masonry units. The roof shall match the main fire station structural standing seam metal roofing.

The screen walls shall match the appearance of the Main Fire Station walls including trim and coping both on the inner and outer sides.

The patio wall shall match the appearance of the Main Fire Station. The patio wall shall be 3'-10" to 4'-0" high. The interior side of the patio wall shall match the appearance of the fire station walls. The patio shall accommodate a gas grill, which can be built into or be part of the wall as an option.

All building walls shall require a minimum of 2-inches of rigid perimeter insulation on the inside of foundation walls extending down to below the frost line.

All areas where thermal bridging can occur shall be insulated to meet the R-value requirements. This includes filling of all voids with fiberglass insulation. The insulation and vapor retarder membranes shall be continuous.

Exterior glazed windows, storefront, and window wall systems for the building shall have thermally broken frames. The finish on the exterior window systems shall be anodized aluminum, color consistent with the Installation Design Guide. The 1-inch insulating glass shall be tinted as indicated in the Installation Design Guide.

All opaque portions of exterior walls shall have a minimum R-value of 15, based on aged insulation values for the entire exterior wall assembly.

1.5.3 Interior Wall Construction

All interior walls shall be permanent construction. Demountable partitions shall not be acceptable.

Interior walls requiring security, fire ratings, or sound ratings, and other walls extending to the underside of the roof structure shall be designed and constructed in accordance with UL or other approved tested assemblies and systems. These walls shall also have provisions for structural deflection of the roof structure above, while maintaining the walls integrity for fire, sound, and security ratings.

Walls assemblies around the Corridors, Conference room, all Dorm Rooms, Dispatch/911 Center, Laundry Room, Day Room, and Physical Fitness Center shall be full height and sound rated with sound attenuation insulation.

See Section 01005: Structural Requirements for criteria used to calculate loads and subsequent deflection control impacting interior walls.

Walls around or separating the Apparatus Bays, Shop Areas, Storage Rooms associated with the Apparatus Bay, and Mechanical Room shall be fire and sound rated concrete masonry units and shall absorb sound and vibrations. Provide furring and gypsum board on the side that faces corridors, offices, work areas and other occupied spaces.

The interior side of exterior walls and the interior walls of the Apparatus Bays, Janitor Closets, Storage Rooms associated with the Apparatus Bays, Disinfection/EMS Decontamination Room, Fire Gear Cleaning Room, Wet/Dry Chemical Fire Extinguisher, and Breathing Apparatus Room shall be of a base material and have a finish that is durable, impact resistant, is scrubbable, washable, cleanable, and resists and does not stain or degrade when exposed to chemicals, blood, cleaning agents, and solvents. Gypsum board or a surface that can be easily damaged is not acceptable.

All interior walls around the perimeter of the Dispatch/911 Center including rooms #124, #125, #126, #127, #128, and #129 shall be minimum 8-inch concrete masonry units. All walls, doors, windows and openings shall be constructed and provide security, 2 hour fire-rated construction as required by NFPA 1221. Exterior windows shall be bullet resistan in accordance with NFPA 1221.

1.5.4 Interior Wall Finishes

Interior wall finishes shall be high quality, low maintenance finishes suitable for the environment of this building.

Generally interior spaces shall receive a painted finish except as described herein and as indicated on the drawings. Color, texture, and pattern selections shall conform to the Fort Carson Installation Design Guide.

Toilet rooms and Locker rooms shall receive a ceramic tile wainscot on all walls. Showers and shower drying areas shall have full height ceramic tile walls.

Office areas, Dorm Rooms, Corridors, Office Areas, and normally occupied areas with gypsum wallboard shall have a painted finish or wall covering finish as indicated on the drawings and coordinated with the Section 01004: INTERIOR DESIGN REQUIREMENTS. The paint system shall be a high performance semi-gloss system. Gypsum wallboard finish level shall be to a level 5 in accordance with the Gypsum Construction Handbook, 90th anniversary edition, Published by U.S. Gypsum Company. Oil based pints shall not be allowed.

The following areas shall have an orange peel wall texture: Toilets, Shower/Locker Rooms, Janitor Closet, Laundry Room, Mechanical, Electrical, Maintenance, and Storage. All walls and areas to receive an orange peel wall texture shall be finished to a level 4 in accordance with the Gypsum Construction Handbook, 90th anniversary edition, Published by U.S. Gypsum Company.

All other rooms to receive a paint finish not otherwise indicated shall receive an orange peel finish wall texture. All walls to receive an orange peel texture shall have the gypsum board walls finished to a level 4 in accordance with the Gypsum Construction Handbook, 90th anniversary edition, Published by U.S. Gypsum Company.

See paint paragraph for other painting systems requirements.

All walls and areas to receive wall covering shall be finished to a level 4 in accordance with the Gypsum Construction Handbook, 90th anniversary edition, Published by U.S. Gypsum Company.

All walls above ceilings not exposed to view shall have a minimum level of gypsum wallboard finish of 1 in accordance with the Gypsum Construction Handbook, 90th Anniversary Edition, Published by U.S. gypsum Company, and as required to meet sound and fire rating requirements. All walls and partitions not extending to the underside of structure above shall extend a minimum 6-inches above the ceiling.

Walls with ceramic tile finishes on steel stud partitions shall have cement backer board as a substrate for tile. Corridors within this facility will be painted to help provide a more durable surface in these areas.

All external corners of interior walls except the Apparatus Bay and adjacent shops areas shall have durable integrally colored vinyl corner protection Coordinate the color schemes with other finishes.

All external corners of interior walls in the Apparatus Bay and adjacent shops areas (except where bullnose masonry units occur) shall have stainless steel corner guards.

1.5.5 Floors

All interior floors shall be concrete slabs.

Depressed floor slabs and mortar bed method shall be used for all floors that will receive ceramic and porcelain tile in accordance with Tile Council of America (TCA) methods.

The slab of the Dispatch/911 Center shall be recessed for the installation of a raised floor system. The structural floor slab shall be recessed a minimum 12-inches below the level of the finished raised floor. The raised floor system shall have 2 feet by 2 feet formed steel panels supported on raised pedestals with bolted stringers. See scheduled floor finishes for each room. See SECTION 01005: Structural Requirements for criteria for slabs on grade.

Evaporative collection trench drains shall be provided at Apparatus Bays as shown. The drainage trenches shall be a minimum clearance width of 12 inches and 8 inches deep. The drainage trench shall have an aluminum or "G-90" galvanized steel open grate with removable panels and finished flush to match the surrounding floor. The grating and trench drain shall be capable of supporting all vehicle loads without failing or cracking (consider PVC in lieu of concrete). The purpose of the drainage trench is to catch water runoff from the vehicles. The trenches shall be self contained with no drainage to an outside source. All concrete floor slabs in the Apparatus Bays shall slope positively towards the trenches as shown.

Depressed floor slabs shall be used to receive recessed entrance floor mats and frames at vestibules, Corridors off of Apparatus Bay, and all other locations where recessed floor mats occur.

All exterior doors shall have structural stoops, designed and constructed so there are not any steps.

Floor of the HAZMAT/Generator Storage Building (Basic and Bid Option) shall have a 4-inch curb as required for containment of spills.

1.5.6 Floor Finishes

Flooring for this facility shall consist of the following finishes.

Concrete floors shall have a non-skid finish and shall be impervious to fuels, (including gasoline, diesel, JP-4, and JP-8). The floor surface must also be sealed to make it impervious to automotive lubricants, cleaning chemicals, and fire fighting chemicals.

Concrete floors of the Apparatus Bays shall be sealed and have a light broomed finish with a light/reflective color.

Floor of the Janitor's Closet shall be sealed concrete.

Porcelain tile shall be installed in Vestibules, Toilet Rooms, Sink Rooms, Shower/Locker rooms including showers, Dining Room, and Kitchen, and shall be set in a cement mortar bed. Porcelain tile floors in Toilet Rooms and associated areas shall be level except in the areas around floor drains which shall be sloped to the drains or as indicated on the drawings. Shower areas, drying areas, and other areas indicated on the drawings shall have the floor slope to allow moisture to flow to floor drains. Control and expansion joints shall be provided in tile floors in accordance with Tile Council of America recommendations. The designer shall locate all tile control and expansion joints so that locations may be reviewed.

Vestibule areas shall receive porcelain tile around the recessed floor mats.

The Corridor floors immediately adjacent to the Apparatus Bays and the

Dining Room adjacent to the patio shall receive a recessed floor mat.

The Kitchen and Dining Room shall receive porcelain tile floor set in a cement mortar bed, in accordance with Tile Council of America Method #F112.

Vinyl composition tile shall be used in the Administrative Support and Break Area, Fire Inspector's Suite, recesses for drinking fountains, Main Entry Corridor and Corridors in the administrative portion of the facility.

Carpeting shall be used in the corridors of the sleeping areas, all office areas, Secretary/Reception area, Dorm Rooms, Day Room, Physical Training area, Library/Crew Meeting Area.

In the Dispatch/911 Center, removable carpet tiles shall be used over the raised floor system. The concrete floor slab beneath the raised floor system shall be coated with an epoxy coating.

The Mechanical, Electrical, Communications, and all other shop and storageareas immediately adjacent to the Apparatus Bays shall have exposed concrete slabs and shall be cleaned and sealed with a concrete hardener for durability and minimization of dust.

1.5.7 Ceiling Finishes

Gypsum wallboard ceilings shall be furnished in Vestibules, Toilet areas, Shower/Locker and Shower rooms, Laundry Room, Janitor's Closets, Physical Fitness Areas, Dorm Room soffits, Kitchen, and shall be painted as indicated and in accordance with specification Section 09900, Paints and Coatings. All gypsum wallboard ceilings shall be a minimum 5/8" thick and shall be painted with a semi-gloss enamel paint. All gypsum wallboard ceilings shall have a smooth texture. All ceiling areas shall be finished to a level 5 in accordance with the Gypsum Construction Handbook, 90th anniversary edition, Published by U.S. Gypsum Company.

The remaining areas, unless otherwise indicated, are generally acoustical tile ceiling panels at least 3/4-inch thick mineral fiber material in a medium-duty suspension system. Acoustical tile shall be installed where indicated on the Room Material and Finish Schedule. Gypsum board and acoustical tile ceilings (gypsum board soffit borders with raised acoustical tile centers) shall be constructed for the Conference Room , Dining Room, Day Room, Library/Crew Meeting Room, and Main Entry Corridor.

It is acceptable for Mechanical, Hazmat Storage (Bid Option)/Generator Room (Basic) of the HAZMAT/Generator Building, Electrical/UPS, Apparatus Bays, Wet/Dry Chemical Fire Extinguisher Room, Disinfect/EMS Decon Room, Storage associated with Apparatus Bays, Fire Gear Cleaning Room, Breathing Apparatus Room,and Communication Equipment Rooms to have exposed structure that do not require any finished ceilings. However, exposed structural elements in these areas will require painting or a spray-applied fireproofing depending on structural design and compliance with applicable building and fire safety code requirements.

1.5.7.1 Ceiling Height

Minimum allowable clearance for ceilings shall be as indicated on the drawings above the finish flooring in all room except the Apparatus Bays #170A through E, which shall have a clear height of 17 feet 6 inches to the underside of structure. Provide gypsum wallboard soffits in Dorm Rooms, Toilets as appropriate, and where wall hung cabinets occur.

1.5.8 Building Demolition and Removal (Option Bid Item)

The demolition and removal of building #1518, the existing main fire station, is an Option bid item to this contract. Building #1518 is a wood structure located northwest of the new Main Fire Station, across Prussman Boulevard. Building demolition and removal shall not begin until the new Main Fire Station is substantially complete and ready to receive equipment from Building #1518. GFGI equipment that is to be moved from Building #1518 to the new Main Fire Station is not salvageable to the contractor. This shall be coordinated during design. There are two critical items to be relocated from Building #1518 to the new Main Fire Station. The existing 911 and Dispatch equipment will be relocated by the Government to the new Main Fire Station. The logistics and timing of relocation of the 911 and Dispatch equipment shall be fully coordinated with the Contracting Officers's representative. The second critical item to be relocated is an existing generator located in Building #1518, which shall be relocated by the Contractor to the Generataor Room of the new Hazardous Materials/Generator Building. The logistics and timing of relocation of the generator and associated equipment shall also be fully coordinated with the Contracting Officers's representative. Building #1518 demolition shall not begin until all equipment that is associated with the new Main Fire Station is removed.

Existing Building #1518 is an approximately 160 feet by 68 feet single story wood framed structure with concrete foundations and spread footings to a depth of approximately 4 feet, with a concrete slab on grade. The eave height is approximately 12 feet and the ridge height approximately 20 feet. Roofing material is asphalt shingles.

The demolition of Building #1518 shall be complete, including removal of the building, all foundations and footings, all floor slabs, utility service lines to the building, 3 wooden poles holding the existing "Harlow" antennas, and the removal of exterior drives, walks, stoops, planters and signage that have the sole purpose of servicing the existing fire station. The pavement shall be removed as indicated in Section 01002: SITE WORK.

Upon completion of the removal, the site shall be fine graded for drainage and established with turf (seed).

The existing transformer shall not be removed as it services other adjacent buildings.

1.6 FUNCTIONAL REQUIREMENTS

1.6.1 Equipment and Specialties.

See Specification Sections 01004: INTERIOR DESIGN REQUIREMENTS, 01006: MECHANICAL REQUIRENMENTS, 01007: ELECTRICAL REQUIREMENTS,and 01008: FIRE PROTECTION REQUIREMENTS for furniture and furnishings, mechanical equipment, electrical equipment, fire protection equipment, and other equipment not described. The equipment listed herein is not all inclusive and shall be coordinated by the contractor with the building users during the design for completeness with regard to items that have been added, deleted, or where requirements have been altered. There will be a coordination effort required with the users of the facilities to understand the particulars of the Equipment and Specialties. Some minor changes to the Equipment and Specialties could possibly occur. The final equipment locations shall coordinated with the building users as intended for

functionality and shall be coordinated with the building design, including locations of electrical, data, and communication outlets, junction boxes for furniture systems, mechanical systems, Dispatch/911 equipment, and lighting within the building. See the aforementioned Specification Sections for other equipment, furnishings and requirements. The equipment locations shall also be coordinated with other building features such as architectural elements, thermostats, lighting, power outlets, telephone outlets, data outlets, and location of TV's, etc.

1.6.1.1 Definitions/Classification of Equipment

Contractor Furnished/Contractor Installed: CFCI
Government Furnished/Contractor Installed: GFCI
Government Furnished/Government Installed: GFGI

1.6.1.2 Not Used
1.6.1.3 Not Used
1.6.1.4 Not Used

1.6.1.5 Function/Activity: Entry Vestibule #101

CFCI
Built-in weatherproof telephone for after hour building access, to Dispatch/911 Center.
Recessed Floor Mat and Frame - 7'-0" x 7'-0"

1.6.1.6 Function/Activity: Entry Corridor #102

CFCI
Fire Extinguisher Cabinets and Fire Extinguishers as applicable.
CCTV ceiling mounted Camera and Accessories

GFCI
Fire Pole (Integrated into the building design and construction, mounted to the floor at the base and wall/ceiling above in the Main Entry area that is open to above, located at the intersection of the north wall of Entry Corridor 102 and the east wall of Corridor 122 in front of the Secretary/Receptionist, and not interfering with building circulation.)
Built-in telephone for after hour building access, to Dispatch/911 Center.

GFGI
Directory/Information Board

1.6.1.7 Function/Activity: Secretary Receptionist #103

CFCI
Built-in radiused Reception Counter with 2 surface heights (1 standing height and 1 sitting and handicapped accessible height).
Built-in wall cabinets at locations shown where there is a full height wall.

GFGI
Computer Equipment,
See Drawings, I-series for furnishings and furniture footprint as applicable.
Fax Machine

1.6.1.8 Function/Activity: Waiting Area #104

CFCI
Built in Casework Bench with concealed storage below/within.

1.6.1.9 Function/Activity: Dispatch/911 Corridor #124

CFCI
8 Double Tier Metal Lockers - 12" x 12" x 72" (36" per tier).
Fire Extinguisher Cabinets and Fire Extinguishers as applicable.

GFGI
Dispatch and 911 Computer Equipment and associated Computer Equipment Racks from Building #1518, existing main fire station.

1.6.1.10 Function/Activity: Dispatch/911 Communications Room #125

CFCI

GFGI
Dispatch and 911 Computer Equipment and associated Equipment Racks from Buiding #1518, existing main fire station.

1.6.1.11 Function/Activity: Dispatch/911 Center #126

CFCI
Bullet Resistant Exterior Window Assembly
Ceiling Mounted Television Bracket and required support for GFGI television
PA System and Accessories
CCTV Monitoring Equipment
Fire Extinguisher Cabinets and Fire Extinguishers as applicable.
4'-0" x 6'-0" Markerboard/Mapboard
Remote Control door switch to magnetic locks at Vestibules 101 and 119.
Antenna Tower for reinstalled "Harlow" and dish type antennas.

GFCI
Existing Reinstalled Antennae and Satellite Dishes from Building #1518, existing main fire station

GFGI
Dispatch and 911 Computer Equipment and associated Computer Equipment Racks from Buiding #1518, existing main fire station.
Dispatch and 911 Consoles and associated equipment from Building #1518, existing main fire station.
Electric Unit Kitchen with 2 burner range, 1 sink, 1 under counter refrigerator, and 1 microwave, similar and equal to those built by "Dwyer Products Company.
Computer Equipment
Fax Machine
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television
Video Cassette Recorder

1.6.1.12 Function/Activity: 911 Supervisor #127

CFCI
Bullet Resistant Exterior Window Assemblies

GFGI
Dispatch and 911 Consoles, Radios, Receivers, and associated equipment from Building #1518, existing main fire station.
Computer Equipment from Builing #1518, existing main fire station.
Fax Machine
See Drawings, I-series for furnishings and furniture footprint as applicable.

1.6.1.13 Function/Activity: Dispatch/911 Toilet #129 and Public Toilet #107

CFCI
Handicapped Accessible
Toilet Accessories
Floor Drain

1.6.1.14 Function/Activity: Corridors #106, #112, #130, #133, #136, #137, #153, and #158

CFCI
Fire Extinguisher Cabinets and Fire Extinguishers as applicable.
Electric Water Coolers (Standard and Handicapped Accessible) as applicable.
Recessed Floor Mats and Frames at Corridor 153 - 4;-0" x 4'-0".

1.6.1.15 Function/Activity: Radio/Communications Closet #132 and Communications Room #178

CFCI
Telephone Backer Board as required
Telephone, Data, and Communications Building Support Equipment and accessories as required
PA System Equipment and Accessories

GFGI
Dispatch and 911 Radios and associated equipment.

1.6.1.16 Function/Activity: Administrative Storage #131

GFGI
Supply Shelving Units.

1.6.1.17 Function/Activity: Janitor Closet #156

CFCI
Shelf with 4 Integral Mop Holders
Floor Mounted Mop Sink
Floor Drain

1.6.1.18 Function/Activity: Conference Room #108

CFCI
Ceiling Mounted Recessed Motorized Projection Screen and Controls, similar and equal to Draper Signature Series
Floor Mounted recessed in floor Duplex Electrical Receptacle centered in room

Floor Mounted recessed in floor Data and Communications Receptacle centered in room
Ceiling Mounted Television Bracket and required support for GFGI television
Ceiling Mounted Retracting Video Projector Mount, similar and equal to Draper LCD Mount
Dry Marker Board mounted on south wall, center

GFGI
Computer Equipment
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television
Video Cassette Recorder
Computer Projector

1.6.1.19 Function/Activity: Conference Room Storage #109, Storage #114, Storage # 140, Storage #134, and Storage #1666

CFCI
Built-in Closet Shelving and Clothes Rod in Rooms 109, 114, 140, 166

GFGI
Supply Shelving Units Room 134

1.6.1.20 Function/Activity: Break Area #111

CFCI
Built-in Base and Wall Cabinets
Single Bowl Stainless Steel Bar Sink with Gooseneck Faucet in Countertop
Water Supply for Coffee Maker
Water Supply for Ice Maker in Refrigerator
Water Supply for Ice Maker
Ceiling Mounted Television Bracket and required support for GFGI television

GFGI
Refrigerator with Ice Maker
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television
Video Cassette Recorder
Microwave Oven

1.6.1.21 Function/Activity: Administrative Support #110

CFCI
Built-in Base and Wall Cabinets

GFGI
Computer Equipment
Photo Copy Machine
Fax Machine

1.6.1.22 Function/Activity: Display Area #105

CFCI
Built-in (2'-2" wide x 2'-0" deep x 7'-0" high) Wood Display/Trophy Case with full height Lockable Glass Door/Hardware and 4 Adjustable Glass

Shelves (7'-0" high). Any aluminum to have natural finish.

1.6.1.23 Function/Activity: Dorm Rooms #115, #135, #138, #139, #141, #142, #143, #144, #145, #146, #147, #160, and #1611

CFCI
Built-in Wood Desk and Overhead Open Cabinet Unit with 2 Adjustable Shelves under a lowered soffit, plastic laminate writing surface.
2 Built-in Wood Wardrobe/Locker/Closet Units with 11" high drawers at the bottom, hat shelf 1'-0" from the top of unit, clothes hanging rod, lockable doors, and under a lowered soffit. Unit to be a total of 7'-0" high and lockable.

GFGI
Computer Equipment
See Drawings, I-series for furnishings and furniture footprint as applicable.

1.6.1.24 Function/Activity: Toilet #116

CFCI
Handicapped Accessible
Toilet Accessories
Built-in Linen Closet with bi-folding wood door and 4 wood shelves
Shower and Base
Shower Curtain Rod, Shower Curtain, and Shower Toilet Accessories
Towel Bars, 36" long, 2 ea.

1.6.1.25 Function/Activity: Fire Chief Office #117

GFGI
Computer Equipment
Fax Machine
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television
Video Cassette Recorder

1.6.1.26 Function/Activity: Shift Leader Office #118

GFGI
Computer Equipment
Fax Machine
See Drawings, I-series for furnishings and furniture footprint as applicable.

1.6.1.27 Function/Activity: Fire Inspector's Suite #120

GFGI
Computer Equipment
See Drawings, I-series for furnishings and furniture footprint as applicable.
Fax Machine
File Cabinets, lateral type, 7 ea., 3'-0" L, 5'-0" H, 2'-6" D

1.6.1.28 Function/Activity: Chief Fire Inspector's Office #121

GFGI
Computer Equipment

Fax Machine
See Drawings, I-series for furnishings and furniture footprint as applicable.

1.6.1.29 Function/Activity: Storage #122 and #123 (For Fire Inspector's Suite)

CFCI
Built-in Closet Shelving with 4 wood shelves

1.6.1.30 Function/Activity: Vestibules #154 and #157

CFCI
Recessed Floor Mats and Frames - 3'-6" x 3'-6"

1.6.1.31 Function/Activity: Apparatus Bays #170 A through E

CFCI
Trench Drains, Evaporative Type
Emergency Eye washes and Showers, 2 each, with associated floor drains, one each side of Apparatus Bay
Utility Sinks, 2 each, one each side of Apparatus Bay
Fire Fighting Gear Lockers, 2 tier, 18" x 18" x 72" each (each tier is 36" high), 36 total, heavy duty metal mesh/ventilated (some could be located in Corridor 170).
Interior and Exterior bollards at each overhead sectional door
Floor Drains and Condensate Drains as required
Compressed Air and retractable hoses and reels
Water Supply as required
Water Supply for Ice Machine (centered on north wall of Apparatus Bays

GFGI
Ice Machine
Hose Drying Rack

1.6.1.32 Function/Activity: Storage Room #173

CFCI
Floor Drain centered in room

GFGI
Heavy Duty Steel Shelving

1.6.1.33 Function/Activity: Disinfection/EMS Decontamination Room #172

CFCI
3 Compartment Stainless Steel Sink Unit with Heavy Duty Faucet
Heavy Duty Steel Shelving
One 3'-0" x 3'-0" Shower and Base
Shower Curtain Rod, Shower Curtain, and Shower Toilet Accessories
Towel Bars, 36" long, 2 ea.
Towel Pins, 6 ea.
Floor Drain
Custom Built Stainless Steel Equipment Wash and Base Drain Area with drain, Stainless Steel Grating/Drip Racks, 5'-0" High continuous Stainless Steel Backsplash, and Heavy Duty Stainless Steel Retainer Clamps
High Pressure Sprayer with 8 foot hose (commercial)
Heavy Duty Clothes Hanging Hooks, 6 ea.

1.6.1.34 Function/Activity: Fire Gear Cleaning #174

CFCI
Washer/Extractor (for fire gear)
Utility Sink
Heavy Duty Clothes Hanging Hooks, 6 ea.
Compressed Air
Floor Drain(s)

GFGI
Heavy Duty Work/Tool Bench (6'-0" wide x 2'-6" deep) with overhead shelving

1.6.1.35 Function/Activity: Wet/Dry Chemical Fire Extinguisher Room #171

CFCI
Floor Drain(s)
Compressed Air
Air Compressor and Accessories

GFGI
Heavy Duty Steel Shelving, 3 sets, 3 shelves each, 7'-0" long x 3'-0" deep x 6'0" high, 800 pound shelf capacity

1.6.1.36 Function/Activity: Breathing Apparatus Room #175

CFCI
Compressed Air
Telephone/LAN Outlet

GFCI
SCBA Compressor and Controls
High Pressure Cylinder, 4 each
Mask Cabinet
Tool Box
PC, Monitor, and Printer
Fill Station
SCBA Units, 30 each
Air Bottles, 75 each

GFGI
Portable Trailered SCBA Filler Unit
Heavy Duty Steel Storage Racks
Heavy Duty Steel Shelving, 3 sets, 3 shelves each, 7'-0" long x 3'-0" deep x 6'0" high, 800 pound shelf capacity

1.6.1.37 Function/Activity: Men's Shower/Locker Room #152

CFCI
3'-0" x 3'-0" Showers and Bases, 3 each
Shower Curtain Rods (6 each), Shower Curtains (6 each) (1 Shower Curtain and Shower Curtain Rod at each shower and each Drying Area), "Fold-down" Benches (3 each) and Shower Toilet Accessories as applicable
Towel Bars, 36" long, 3 ea.
Towel Pins, 6 ea.
11 ea. Double Tier Metal Lockers - 12" x 12" x 72" (36" per tier, total of 22 Lockers), solid panel with venting, upper storage shelf, clothing hanger rod or hooks, and lockable with a padlock.
Floor Drains

1.6.1.38 Function/Activity: Men's Sinks #150

CFCI
Lavatories (3 each) in full vanity top with backsplash
Glass Mirrors, 3 each, (18" x 30" min.) or full wall mirror
Soap Dispensers (liquid type under counter), 3 each
Paper Towel Dispenser/Waste Receptacle Combination Units, 2 each (fully recessed)
Other Toilet Accessories as applicable
Medicine/Supply Storage Closet with 4 Wood Shelves
Towel Pins, 6 ea.
Floor Drain

1.6.1.39 Function/Activity: Men's Toilet #151

CFCI
Urinals, 3 each
Urinal Screens as applicable
Toilets, 2 each
Toilet partitions, as applicable with coat hooks
Toilet Tissue Dispensers (recessed in partition type)
Other Toilet Accessories as applicable
Floor Drain

1.6.1.40 Function/Activity: Women's Toilet #148

CFCI
Lavatories (1 each) in full vanity top with backsplash
Glass Mirrors, 1 each, (18" x 30" min.) or full wall mirror
Soap Dispensers (liquid type under counter), 1 each
Paper Towel Dispenser/Waste Receptacle Combination Units, 1 each (fully recessed)Toilets, 1 each
Toilet partitions, as applicable with coat hooks
Toilet Tissue Dispensers (recessed in partition type)
Sanitary Napkin Dispenser, 1 ea.
Sanitary Napkin Disposer, 1 ea.
Other Toilet Accessories as applicable
3 ea. Double Tier Metal Lockers - 12" x 12" x 72" (36" per tier, total of 6 Lockers), solid panel with venting, upper storage shelf, clothing hanger rod or hooks, and lockable with a padlock.
Towel Pins, 1 ea.

1.6.1.41 Function/Activity: Women's Shower #149

CFCI
3'-0" x 3'-0" Showers and Bases, 1 each
Shower Curtain Rods (2 each), Shower Curtains (2 each), and Shower Toilet Accessories as applicable
Towel Bars, 36" long, 1 ea.
Towel Pins, 2 ea.
Built-in Bench
Floor Drain

1.6.1.42 Function/Activity: Laundry Room #155

CFCI
Laundry/Utility Sink, 1 each
Built-in Wall Cabinet over Utility Sink

Built-in shelf over Washer/Dryer Area
Clothes Hanging Rods
Built-in Folding Table/Surface, 2'6" deep min., open underneath, standing height, with built-in wall cabinets above
Floor Drain
Washer Utility Connections, 2 ea.
Dryer Utility Connections, 2 ea.
Dryer Exhaust, 2 each
Laundry Room Exhaust as required

GFGI
Washers, 2 each
Dryers, 2 each

1.6.1.43 Function/Activity: Library/Crew Meeting #164

CFCI
Ceiling Mounted Recessed Motorized Projection Screen and Controls, similar and equal to Draper Signature Series - centered in front of south wall
Floor Mounted recessed in floor Duplex Electrical Receptacles centered in room
Floor Mounted recessed in floor Data and Communications Receptacles centered in room
Ceiling Mounted Television Bracket and required support for GFGI television
Ceiling Mounted Retracting Video Projector Mount, similar and equal to Draper LCD Mount
4'-0" x 8'-0" Dry Marker Board - East side of south wall
3'-0" x 6'-0" Bulletin Board - West Side of south wall

GFGI
Computer Equipment
Fax Machine
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television
Video Cassette Recorder
Computer Projector

1.6.1.44 Function/Activity: Captain's Office #159

CFCI
Key Storage Cabinet

GFGI
Computer Equipment
Fax Machine
See Drawings, I-series for furnishings and furniture footprint as applicable.

1.6.1.45 Function/Activity: Physical Training #162

GFGI
Exercise Equipment
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television

Video Cassette Recorder
AM/FM Stereo Receiver, Tuner, CD Player, and Cassette Player, 4 Hi-Fi Speakers

1.6.1.46 Function/Activity: Day Room #163

GFGI
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television
Video Cassette Recorder
42-Inch flat Screen Television
DVD Player
AM/FM Stereo Receiver, Tuner, CD Player, and Cassette Player, 4 Hi-Fi Speakers

1.6.1.47 Function/Activity: Dining Room #165

CFCI
Built-In Wood Casework Eating Peninsula with accessible storage from each side, and minimum of 2 duplex receptacles at sides
Operable Accordion Partition between Dining Room and Library Crew Meeting Room, STC-44

GFGI
See Drawings, I-series for furnishings and furniture footprint as applicable.
27-inch Television
Video Cassette Recorder

1.6.1.48 Function/Activity: Kitchen #167

CFCI
Built-In Wood Casework Food Preparation Island with accessible storage from each side, and minimum of 2 duplex receptacles at sides
Built-in wood Base Cabinets
Built-in wood Wall Cabinets
Built-in 30" wide high capacity commercial Dishwasher
Built-in dual basin kitchen sink with "Gooseneck" type Faucet and Sprayer
Garbage Disposal
Gas Range/Oven, 6 burner, commercial
Kitchen Canopy Exhaust Hood
Floor Drains and Condensate Drains as required
Ice Making Machine
Water supply for Ice Machine
Water Supply for Coffee Maker

GFGI

Coffee Maker
See Drawings, I-series for furnishings and furniture footprint as applicable.

1.6.1.49 Function/Activity: Refrigerator/Freezer Room #168

CFCI
Exhaust for Room, adequate exhaust of build up of equipment heat
Floor Drain and Condensate Drain as required

GFGI
Commercial Upright Refrigerator
Commercial Upright Freezer
Microwave Oven

1.6.1.50 Function/Activity: Pantry #169

CFCI
Built-in Closet Shelving with 5 adjustable wood shelves.

1.6.1.51 Function/Activity: Mechanical Room 176, Electrical and UPS Room 177

CFCI
Mechanical and Electrical Building Support Equipment and accessories as required
Floor Drains as required

1.6.1.52 Function/Activity: Patio

CFCI
Natural Gas Line/Outlet for Gas Barbecue Grill
Floor Drain
3'-10" to 4'-0" high Masonry Screen Wall to match Building Wall

GFGI
Natural Gas Barbecue Grill

1.6.1.53 Mechanical Courtyard

CFCI
7'-10" to 8'-0" high Masonry Screen Wall to match Building Wall

1.6.1.54 Function/Activity: HAZMAT Storage/Generator Building, Generator Room, Room #001 (Basic)

CFCI
4" retaining curb or other means of retaining hazardous materials as required.
Mechanical ventilation/other as required

1.6.1.55 Function/Activity: HAZMAT Storage/Generator Building, HAZMAT Storage, Room #002 (Bid Option)

CFCI
4" retaining curb or other means of retaining hazardous materials as required.
Mechanical Ventilation as required

GFCI
(Basic) Emergency Generator, from existing Building #1518, Contractor to Relocate in HAZMAT/Generator Building, Generator Room and coordinate phasing.

1.6.2 Occupational Safety and Health

Building design shall comply with OSHA Occupational Safety and Health Standards criteria for all items which must be included in the design to ensure safety compliance.

1.6.3 Handicapped Accessibility

The administrative, public spaces of the building, and the Dispatch/911 Center shall comply with handicap accessibility requirements as outlined in the American With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities. All spaces occupied by fire fighting personnel can be non-handicapped. Handicapped access to the main entrance and the Dispatch/911 Center shall be provided.

1.6.4 Interior Sound and Vibration Control

The facility is located off of the main access to the Post and as such, vehicle traffic occurs at all hours of the day and night, therefore sound control within the facility is very important to allow the personnel within the facility to sleep while these situations occur. When constructing walls, floors, ceilings, and roofs, materials shall be selected that will impede transmission of equipment vibrations and noise between rooms and within a room.

Interior walls requiring sound ratings shall extend up to the underside of structure, or be capped with solid ceiling construction to limit sound transmission from one space to another.

Dorm rooms, Laundry Room, Physical Training Room, and Day Room are to be enclosed in construction that have a minimum STC rating of 45 for walls. Minimum STC of 45 is required for walls and doors of these rooms.

Concrete masonry unit walls enclosing Mechanical Rooms, Electrical Room, Dispatch/911 Center Rooms, and all Shop type areas shall be sand filled (unless other requirements govern) to reduce sound transmission into the space and shall have minimum STC ratings of 45.

Windows and doors in Dispatch/911 Center shall be sound rated to provide a STC of 45.

Conference Room #108, Break Area #111, all Corridors, Toilets, Lockers, and Showers, Fire Chief's Office #117, Shift Leader's Office #118, Chief Fire Inspector's Office #121, Fire Inspector's Suite #120, Captain's Office #159, Library/Crew Meeting Room #164, Dining Room #165, and Kitchen #167 shall have walls with a minimum of STC 40 to 42.

1.6.5 Physical Security

Conventional security measures, such as: door locking hardware, door viewers, cypher locks, magnetic locks, and other means shall be incorporated into the facility design and development. See UFC -4-010-01 for other minimum applicable anti-terrorism requirements. See also specific paragraphs in this section for additional security criteria.

The Main Entry Vestibule #101 and Vestibule #119 entrances shall have remote locking/unlocking capabilities controlled from the Dispatch/911 Center. All entrances to the building except those designated as "exit only" shall have cypher locks and all occupants entering and exiting the facility shall be visually monitored by CCTV.

Blast Resistant and Fragment Retention glass and frame system shall be provided to all exterior windows to minimize the spread of glass fragments when glass is shattered. The inner pane of insulating glass units for windows and doors shall be a minimum of 1/4-inch thick annealed laminated

glass.

Access to roofs shall be controlled.

The Dispatch/911 Center and associated spaces shall have a bullet resistant exterior windows and 2-hour fire rated enclosure including walls and doors, and other requirements in accordance with NFPA 1221.

1.6.6 Composition of Masses and Spaces and Architectural Details to Reflect the Desired Image, and the Scale and Nature of the Activities Involvedd

Features of scale such as horizontal banding, and changes in material and texture shall be used to tie the building together with the ground line and adjacent volumes and masses. Colors and materials selected for the exterior of this buildings shall be match those defined in the Installation Design Guide Guide, Fort Carson, CO and the enclosed documents and drawings. Materials selected shall be compatible with "commercial" construction.

1.6.7 Economy of Building Construction, Operation, and Maintenance: Life-Cycle Cost Effectiveness

1.6.7.1 Economy

All materials shall be readily available within the local area, as shall sufficient trades to construct the building.

No special or unique forms of construction shall be used and skilled workers within the area shall be familiar with the proper methods required to build this facility.

1.6.7.2 Operations and Maintenance

Material selections shall be based upon reducing operation and maintenance costs. All materials shall be easy to clean and resist soiling.

1.7 TECHNICAL REQUIREMENTS

1.7.1 Miscellaneous Metals

Information regarding miscellaneous metals shall be referenced to the Unified Facilities Guide Specifications (UFGS), SECTION 05500, MISCELLANEOUS METALS for design criteria and minimum quality requirements.

1.7.1.1 Steel Pipe Handrails & Guardrails

Handrails and guardrails shall meet the requirements of OSHA. All structural components of the handrails and guardrails system shall be covered with a coating system at interior locations.

1.7.1.2 Access Doors and Panels

Access doors and panels shall be flush type. Frames for access doors shall be fabricated of not lighter than 16 gauge steel with welded joints and finished with anchorage for securing into construction. Access doors shall be a minimum of 14-inches by 20-inches and of not lighter than 14 gauge steel, with stiffened edges, complete with attachments. Access doors shall be hinged to frame and provided with a flush face and a keyed operated latch. Exposed metal surfaces shall have a shop applied prime coat.

Finished paint coat shall match surrounding surfaces. Panel shall be installed in unhabitable rooms (i.e., closets, janitor closets, mechanical rooms) and/or non-conspicuous locations. Access to all pipe chases and cleanouts shall be provided.

1.7.1.3 Miscellaneous

Detailing and construction of louvers, motorized dampers, bird screens and ductwork shall be fully coordinated with each other and other mechanical and electrical items so as not to cause interferences. Color of louvers shall be compatible with wall material color and shall be approved as part of the color board and in accordance with the Fort Carson Installation Design Guide. All louvers shall be storm proof type to not allow entrance of wind blown precipitation. All louvers shall have bird screen mounted on the interior side of the louver.

1.7.1.4 Sun Screens

Sun Screen shall be steel or aluminum fabrications located where shown on the drawings. Sun screens shall be 8-inches wider than the openings in which they occur and protrude 3 feet from the face of the building. Sun screens can include vertical fins of the same material as the frame spaced horizontally to shade window or door openings. Sun screens shall be braced back to the building as shown. Finish shall match that of other building trim.

1.7.2 Finish Carpentry

Information regarding finish carpentry shall be referenced to the Unified Facilities Guide Specifications SECTION 06200, FINISH CARPENTRY for design criteria and minimum quality requirements.

A. Fire retardant treated lumber shall not be used in this facility except at electrical and communication panel board locations.

B. All interior wood molding, shall be of the red oak species, Grade 1 in accordance with the grading rules per AWI. All interior wood trim items shall be sanded smooth and finished to match the wood doors, other trim to coordinate with interior color scheme.

C. Wood chair rails shall be molded solid oak, sanded smooth, and a minimum 2 1/2 inch in height. Wood chair rail shall be a decorative molding with several curvature moldings. Chair rail trim shall be installed at 30 inches above the finished floor. Final mounting height and dimensions shall be coordinated.

D. Shelving shall be a prefabricated particle board, 3/4-inch thick with a curved edge or 3/4-inch plywood with a continuous hardwood edge would be considered acceptable. All shelving shall be painted. Utility shelving shall be provided at locations shown on the drawings.

E. Clothing rods shall be an aluminum pipe or tubing 1 inch in diameter.

F. Window Stool shall be a solid surfacing material and shall be provided at each exterior window location. Material and decorative edge treatment characteristics shall match solid surface countertops. Window stool shall have a minimum one inch overhang at the wall/stool location.

1.7.3 Roof Design

Information regarding the roof shall be referenced to the Unified Facilities Guide Specifications (UFGS) for the following sections:

SECTION 07131, ELASTOMERIC SHEET WATERPROOFING,
SECTION 07720A, ROOF VENTILATORS, GRAVITY-TYPE,
SECTION 07220, ROOF AND DECK INSULATION,
SECTION 07416A, STRUCTURAL STANDING SEAM METAL ROOF (SSSMR) SYSTEM,
for design criteria and minimum quality requirements.
SECTION 07551A, MODIFIED BIITUMEN ROOFING
SECTION 07600, FLASHING AND SHEET METAL
SECTION 07900A, JOINT SEALING

1.7.3.1 Standing Seam Metal Roofing System

A. Portions of the facility shall be covered with a standing seam metal roof system. The critical aspects of the roofing system shall be appearance, and minimal maintenance. Roof panels shall have a high performance polyvinylidene fluoride finish with minimum paint thickness of 1.0 mils. Aluminum panels shall not be permitted.

B. All roofing areas, except as otherwise noted, shall have roof slopes a minimum of 3-inches per 12-inches . Roof system shall meet the wind uplift requirements given in SECTION 01005: Structural Requirements. The standing seam metal roof system shall consist of the standing seam metal roof on concealed clips, fastened to steel roof purlins, an ice and water shield, rigid insulation (thickness as required to meet the RSI value specified herein), continuous vapor retarder membrane, over a structural steel roof deck. The roof design presented in this document has been approved by the Post, alternate roof designs can be submitted for approval by the Post and the Corps of Engineers.

C. Primary roof slope shall be accomplished by sloping of the structural roof framing members to a gutter and downspout drainage system. The Civil Requirements Section and the enclosed drawings identify which downspouts are discharged onto a splash block and which ones are connected into the underground storm sewer system.

D. Roof system shall provide a 20 year minimum warranty and include weathertightness and finish.

E. Lightning protection shall be fully integrated and coordinated with the roofing detailing, and installation to not jeopardize in any way the roof warranty.

F. The roofing panels and concealed clips shall be capable of supporting a minimal uniform live load as calculated by the criteria defined in Section 01005: Structural Requirements.

G. Roofing panel shall be free to move in response without damage to expansion and contraction forces resulting from a total temperature range of 220 degrees F.

H. External reinforcement to improve uplift resistance, such as clamps on the ribs, and/or bolts through the seams is not considered acceptable.

I. The roofing panel finish shall be a factory applied baked-on fluoropolymer topcoat over a factory applied prime coat.

The exterior coat shall consist of a nominal 2 mil thickness consisting of a polyvinylidene fluoride topcoat and the paint manufacturer's recommended primer of not less than 0.2 mil thickness.

The interior coat shall consist of a nominal 1 mil thick polyvinylidene fluoride finish otherwise the same as the exterior and the paint manufacturer's recommended primer of not less than 0.2 mil thickness.

J. The roofing panel salt spray panel test shall receive a rating of 10 (no blistering) and a rating of 8 (3/64-inch failure) per ASTM D 714.

K. The roofing panel abrasion resistance test shall withstand a minimum of 80-100 liters.

L. A separate vapor retarder membrane (also referred as a vapor barrier) membrane shall be laid directly over the roofing deck and under the rigid insulation. The vapor retarder shall be laid over the entire facility roofing area. Care shall be exercised to not damage or rupture the vapor retarder membrane during it's installation or the installation of other roofing system components.

M. A continuous 60 mil ice and moisture water barrier membrane shall be installed at all roof eave, roof ridge, and valley conditions. The membrane shall extend a minimum of 36 inches up from the eave roof edge and on either side of the ridge and valley center line.

N. Provide snow guard (fence type) protection on the roof over all personnel and vehicle doors and adjacent walkways to the facility. Any feature that prevents sheets of ice from sliding off the roof shall be included. Snow guards shall not penetrate the roof and shall be an integral part of the roofing system and shall not affect the warranty furnished by the roofing manufacturer. Snow guard shall be factory finished and shall match that of the roof system. Adhesively applied snow guards shall not be permitted.

1.7.3.2 Modified Bitumen Roofing

A. Portions of the facility shall be covered with a modified bitumen roof system. The critical aspects of the roofing system shall be weathertightness and minimal maintenance. Roofing shall have a light colored aggregate surfacing.

B. All roofing areas, except as otherwise noted, shall have roof slopes a minimum of 1/2-inch per 12-inches. Roof system shall meet the wind uplift requirements given in SECTION 01005: Structural Requirements. The roof system shall consist of the modified bitumen membrane plies, adhesive, walkway surface where necessary, base sheet, rigid insulation (thickness as required to meet the RSI value specified herein) mechanically fastened to structural steel roof deck, cants as required, tapered edge strips for slope away from parapets and to roof drains, metal flashings, loose laid concrete pavers as required, and continuous vapor retarder membrane, over a structural steel roof deck. The roof design presented in this document has been approved by the Post, alternate roof designs can be submitted for approval by the Post and the Corps of Engineers.

C. Primary roof slope shall be accomplished by sloping of the structural roof framing members to an internal roof drain with overflow drains

drainage system. The Civil Requirements Section and the enclosed drawings identify which drains are discharged onto grade and which ones are connected into the underground storm sewer system.

1.7.3.3 Roof Insulation

A. Roofing insulation shall be a polyisocyanurate type. A minimum aged "R" value of the roofing insulation shall be R-33, based upon a R-5.56 per 1-inch of thickness. Therefore, the total roofing insulation thickness allowed shall be a minimum 6-inches.

B. A single ply vapor barrier shall be installed between the roofing deck and the bottom of the roofing insulation. The thickness of the vapor barrier shall be in accordance with the roofing system standard thickness. The installation shall be in accordance with government supplied specification Section 07220 Roof Insulation.

C. Sheets shall be installed with the maximum sizes possible in order to minimize cuttings.

D. Roof system shall provide a 10 year minimum warranty and include weathertightness and finish.

E. Lightning protection shall be fully integrated and coordinated with the roofing detailing, and installation to not jeopardize in any way the roof warranty.

F. A separate vapor retarder membrane (also referred as a vapor barrier) membrane shall be laid directly over the roofing deck and under the rigid insulation. The vapor retarder shall be laid over the entire facility roofing area. Care shall be exercised to not damage or rupture the vapor retarder membrane during it's installation or the installation of other roofing system components.

1.7.3.4 Roof Ventilators

A. Roofing penthouse ventilator shall be designed for wind speeds of not less than 36 meters per second (80 mph).

B. All roofing ventilators are stationary units.

C. Ventilator paint finish thickness shall match the roofing panels.

D. Bird screen shall be provided on each ventilator. Screens shall be furnished by the ventilator manufacturer and easily removed for periodic maintenance.

E. See Mechanical Requirements for additional information.

1.7.4 Exterior Insulation and Finish System (Not Used)

1.7.5 Factory Insulated (Foamed in Place) Pre-Finished Flush Metal Siding Wall Panels

Information regarding general pre-finished and factory insulated (foamed in place CFC free)flush metal wall panels shall be referenced to the Unified Facilities Guide Specifications SECTION: 07413, METAL SIDING for design criteria and minimum quality requirements. The panels shall be finished with a high performance architectural coating that shall be warranted for

20 years. Oil canning of the panels shall not be allowed.

A. The wall panels and fasteners shall be designed to withstand wind loads normal to the plane of the wall as calculated by the criteria defined in Section 01005: Structural Requirements.

B. Vertically oriented wall panels shall be flush architectural type and shall have a stucco embossed exterior face. Flush is defined as a relatively smooth exterior profile with slightly grooved striations not more than 1mm (1/32") which can add a very light shadow line and as required for additional panel strength and to prevent oil-canning of the panels. Exterior skin shall be 24 gage steel minimum. Aluminum shall not be permitted.

C. The interior face of the wall panel shall have the same paint dry film thickness as the exterior metal panels.

D. The wall panel salt spray panel test shall receive a rating of 10 (no blistering) in accordance with ASTM D 714. The panel shall also have a rating of 10 with no edge creep failure at scribe per ASTM D 1654.

E. The panel formability test shall have been bent over a 1/8 or 3T, whichever is greater, in accordance with ASTM D 522 and show no evidence of fracturing to the naked eye.

F. The panel shall show no evidence of blistering and cracking when subjected to a humidity test for 1500 hours in accordance with ASTM ASTM D 2247. Panels shall be G90 galvanized.

G. The wall panel abrasion resistance test shall withstand a minimum of 80-100 liters.

H. A specular gloss value of 30 to 70 at a 60 degree angle. The wall panel color shall be in accordance with the Fort Carson Installation Design Guide and shall be semi-gloss in appearance.

I. Factory insulated wall panels shall have a UL or FM approval for Class I non load bearing wall panels. Panels shall have a flame spread not higher than 25 and a smoke development rating not higher than 450 in accordance with ASTM E 84.

J. Wall panels shall be double interlocking tongue and groove panels with concealed fasteners.

K. Interior panel skin shall be 26 gage minimum 2100 mm (7 ft.) in height above the finished floor. A matching metal 4 inch base trim shall be provided. Panels and base and accessories shall have a factory applied baked enamel finish.

L. Laminated wall panels shall not be permitted.

M. Panels shall be 2 1/2" thick and shall have an R-value of 15 minimum.

1.7.6 Sheet Metalwork, General

Information regarding general sheet metalwork shall be referenced to the Unified Facilities Guide Specifications SECTION 07600, FLASHING SHEET METAL for design criteria and minimum quality requirements.

A. Contractor shall include a quality assurance plan which includes a checklist of points to be observed, prior to start of roofing work.

B. All interior cavity thru-wall flashing shall be a metal type. A non-metal elastomeric ply sheeting is not considered to be acceptable.

C. Metal fascias, trim, and soffits shall have "V" crimps and a stable substrate as required to prevent "oil-canning" effect. Fascias, trim, flashings and soffits shall be prefinished.

D. All sheet metal work shall be done in accordance with SMACNA plate standards and recommendations.

E. Downspouts and gutters shall have a factory finish applied. Gutters shall have support straps and additional brackets as required. Galvanized or field applied painting is not acceptable. Downspout boots shall be provided to attach the downspouts to an underground drainage system where required.

F. Any exposed ductwork shall be oval or round and painted to match adjacent areas.

G. All louvers shall be designed and constructed with bird screens. Louver design shall be a weather/stormproof type so as to prevent wind blown snow and rain from entering the building.

1.7.7 Doors

UFGS Requirements

Information regarding doors shall be referenced to the Unified Facilities Guide Specifications (UFGS) for the following sections:
SECTION 08110, STEEL DOORS AND FRAMES,
SECTION 08120, ALUMINUM DOORS AND FRAMES,
SECTION 08210, WOOD DOORS,
SECTION 08330A, OVERHEAD ROLLING DOORS
SECTION 08331A, METAL ROLLING COUNTER DOORS
SECTION 08361, SECTIONAL OVERHEAD DOORS
for design criteria and minimum quality requirements.

General Requirements

A. All exterior steel and aluminum door frames shall have a thermal break to prevent temperature transferring. Steel door frames shall be used with only hollow metal doors and aluminum door frames shall be used only with aluminum doors. All pressed steel door frames for all types of doors located in masonry walls shall be one-piece welded construction grouted full, with a minimum of 3 anchors per each jamb.

B. All exterior doors shall be complete door and frame assemblies which include; weatherstripping, door bottoms, and thresholds. All exterior personnel doors shall have overhead door stops as indicated herein, and an additional floor stop to prevent the doors from bending and racking when caught by the wind. The stops shall be adjusted so both stop the door at the same degree of opening..

C. All exterior doors opening on to a structural concrete stoop and shall conform to NFPA #101 for floor slope at the door.

D. Doors in fire rated walls shall be fire rated according to the fire rating requirements of the walls in which they occur. All fire doors shall be in accordance with the requirements of NFPA #101.

E. Typical personnel door leaf (single) size for wood, aluminum , and steel shall generally be 3'-0" wide x 7'-0" high x 1 3/4" thick.

F. All doors from corridors to administrative office suites that have door closers shall have magnetic hold-open devices that are tied into the buildings smoke detection and fire alarm system. The activation of a detector or alarm shall release the doors.

1.7.7.1 Steel Doors and Frames

A. All exterior personnel service and exit doors shall be a flush insulated steel door type with minimum 10-inch x 10-inch vision panels as appropriate except doors to Mechanical, Electrical, and Communications Rooms shall be flush. Doors and frames shall have a designation G60 galvanized. Exterior door frames shall be a one-piece frame unit.

B. All interior personnel doors that are not wood doors shall be a flush hollow metal door type with minimum 10-inch x 10-inch vision panels except doors to Secure Areas, Janitor Closets, and Communication Rooms. Doors and frames in steel stud and gypsum wallboard walls shall have a designation A40 galvanized. All interior door frames in steel stud and gypsum board walls shall be a one-piece or "dry-wall" frame unit with the "wrap-around" edges.

C. All exterior and interior steel doors and frames shall be factory primed and field finished.

D. All exterior steel doors such as for Mechanical Room, Electrical/UPS Room, Storage 173, and personnel exits from Apparatus Bays shall be heavy duty with a minimum of 16 gauge face sheets with 16 gauge pressed steel door frames, shall be weather tight and weatherstripped, and insulated to meet a minimum R-value of 7.

E. All interior hollow metal single and double doors located between the Apparatus Bays and the administrative portion of the facility, shops, operations areas, any occupied area, and corridors shall be fire rated according to the fire rating requirements of the walls in which they occur and shall meet the minimum exterior door thermal insulation requirements.

F. All hollow metal door construction shall meet or exceed heavy duty (Grade II) requirements. Door and door frame construction shall be rated according to the fire rating requirements of the walls where they are shown.

1.7.7.2 Aluminum Doors and Frames

A. All exterior personnel entrance doors at vestibules shall be aluminum doors and incorporated into store front window wall system as applicable and as shown on the elevations. All front and secondary entry vestibule doors shall be insulated medium stile aluminum doors, full glazed with integral divided lites, with an anodized aluminum finish. The glass in the exterior vestibule doors shall be 1-inch insulating laminated glass. The glass in the interior vestibule doors shall be 1-inch insulating glass. The glass in the exterior vestibule doors shall be tinted to match the exterior glazing and the glass in the interior vestibule doors shall be clear.

Adjacent glazing shall match the door glazing in color.

1.7.7.3 Wood Doors

A. All interior doors in the administrative and sleeping/operations area that is not in the Apparatus Bays shall be flush solid core wood type doors unless indicated otherwise herein or on the drawings. This includes doors to Physical Training, Day Room, Library/Crew Meeting Room, Dining Room and Kitchen. Doors to private offices, toilets, dorm rooms, storage and janitor closets shall not have vision lites. Doors to office suite and other doors shall have 4-inch x 24-inch or 9" x 9" vision panels. Spaces that are exclusively administrative shall have wood doors. This includes all doors to suites from corridors. Doors to Conference Room and from administrative to sleeping/operations area shall be fully glazed wood doors with divided lites.

B. Doors shall be 5 ply or 7 ply construction with premium grade, book matched red oak veneer with oak edges set in pressed steel door frames per Unified Facilities Guide Specification 08210.

C. A natural transparent finish over a light stain with a medium rubbed effect shall be applied to all interior doors.

D. Interior wood bi-folding doors shall be constructed of solid core wood consisting of premium grade red oak, in accordance with Unified Facilities Guide Specification 08210. All door shall be flush type.

1.7.7.4 Sectional Overhead Doors and Overhead Rolling Doors

A. Sectional overhead doors shall be provided as shown on the drawings. Overhead doors shall be a minimum 3-inch thick, heavy duty commercial standard lift type designed to slide up and back into a horizontal overhead position. All overhead sectional door assemblies shall be coordinated with all other systems and equipment so as not to interfere during full open and closed positions.

B. The typical sectional overhead door and door support frame for large doors of the Apparatus Bays shall provide a minimum 15'-2" clearance height and a minimum width clearance of 14'-0". The smaller overhead sectional doors of the Apparatus Bay for administrative vehicle (Fire Chief, Shift Leader, and Chief Fire Inspector - Option) shall provide a minimum 15'-2" clearance height and a minimum width clearance of 12'-0". The smaller overhead rolling door for the Breathing Apparatus Room 175, shall provide a minimum 7'-2" clearance height and a minimum width clearance of 7'-4", and shall be insulated.

C. Doors shall be designed to withstand a minimum wind load as calculated by the criteria defined in Section 01005: Structural Requirements.

D. Doors shall be equipped with torsion springs or mechanisms designed to operate through a minimum of 100,000 cycles. Each door shall be equipped with electric sensing edge to avoid entrapment.

E. Door exterior panel section shall be constructed of hot-dipped galvanized steel not lighter than 16 gauge. Panel sections shall be insulated and shall provide a minimum R-value of 14.5 and concealed with an inner galvanized panel section not lighter than 24 gauge.

F. Vision lites shall be glazed with DSB glass. All overhead doors shall

have a minimum of three 24-inch x 12-inch windows with insulating glass, as standard with the manufacturer.

G. Door operation shall be by means of electric power operators with an auxiliary emergency chain hoist (including Breathing Apparatus Room) for use in the event of a power failure. All doors must be capable of opening within a maximum of 20 seconds, and close no faster than 30 seconds. All door shall be electrically controlled by remote controls. For the Apparatus Bay doors, provide also 3 button (open, close, and stop) manually operated controls adjacent to each door and banks of manual controls at each side of the Apparatus Bays near each personnel door (nearest the dorms on the sleeping area side). Doors shall be equipped with special signaling system, with red and green lights. The green light signal will turn on when the door is in the fully open position. The signaling system shall be located on the driver's side of each door, mounted approximately 6'-0" above the finished floor.See ELECTRICAL REQUIREMENTS for additional information on the door motors, remote controls, switches, controls, and power operation.

H. Door shall be factory primed and finish paint coating shall be a factory applied baked-on enamel finish.

1.7.7.5 Metal Rolling Counter Doors and Fire Shutters

A. Metal rolling counter door, frame, guides, and hood shall be fabricated of stainless steel. Door slats shall be a minimum of 22 gauge thickness. Curtain door shall be have a padlock locking capability on the inside of the room door side. Door shall be manually operated.

B. Fire shutters over windows shall maintain the fire rating of the wall the window openings are in. Fusible links and/or connectivity with the fire alarm system shall be provided.

1.7.7.6 Special Doors

A. Doors and frames located at rooms and walls shown or identified with STC requirements shall meet or exceed the shown or identified STC requirements. Completed and installed door assemblies shall be tested to ensure compliance with the shown STC requirements.

B. Door frames for double doors located where STC ratings are required will be furnished with a removable mullion frames for movement of large items through the opening.

C. Operable partition (accordion type) shall be located between the Dining Room and the Library/Crew Meeting Room. This door shall have an STC rating of 44.

1.7.8 Hardware; Builder's (General Purpose)

Information regarding door hardware shall be referenced to the Unified Facilities Guide Specifications, SECTION 08710, DOOR HARDWARE for design criteria and minimum quality requirements and as specified herein. All door hardware material shall be compatible with the door material.

1.7.8.1 Hinges

All hinges shall be grade I with a minimum of 3 hinges per door for a single type door for doors 7'-0" high. Excessively heavy (sound doors) or

tall doors shall have additional or special hinges provided as recommended by the door manufacturer. Hinges shall be fully recessed (mortised) and fit flush within designated frame slots.

All exterior doors shall have a A5111 type hinge, unless noted otherwise.

All interior doors shall have a A8111 type hinge, unless noted otherwise.

1.7.8.2 Locks and Latchsets

All exterior and interior door locks and latchsets shall be series 1000 mortised type.

1.7.8.3 Lock Cylinders

Lock cylinders shall have six or seven pins, and in accordance with the Post's locksmith requirements.

Cylinder shall have key removable type cores. Disassembly of knobs, levers and locksets shall not be required to remove core from lockset. Fort Carson utilizes Best Locks for cores.

Provide a minimum of 5 spare cores, 2 blank master key sets and 10 blank keys.

1.7.8.4 Lock Trim

The doors of this facility shall have lever handles. All exterior doors having panic type fire exit hardware shall have lever handles opposite the exit device as exterior trim.

All exit devices installed on hollow metal and aluminum doors shall be Type 6 (Narrow Stile Concealed Vertical).

All exit devices installed on wood doors shall be Type 4 (Narrow Stile Rim Exit Device).

1.7.9 Keying

Locks and special key hardware shall be keyed to the Fort Carson master key system or equal compatible lock system with interchangeable cores.

A grand master keying system shall be provided. All of the keys shall be keyed in one series, except the mechanical, electrical and communication equipment rooms. This lock keying shall be compatible to the Post's locksmith requirements. All locks and special key hardware shall have interchangeable cores. The keying schedule shall be coordinated with the User through the Corps of Engineers.

Locks for all mechanical, electrical, and communications equipment rooms shall be keyed to the existing Base utility keying system.

1.7.10 Door Closing Devices

Surface type overhead door closures shall be Grade 1, Series CO2000 Standard Cover. Closures shall be size VI.

1.7.11 Auxiliary Hardware

Door floor stop and holder for exterior doors shall be Type L01371.

Door wall stops shall be Type L02251.

Door floor stop and holder for interior doors (without thresholds) shall be Type L02141.

Door floor stop and holder for interior doors (with thresholds) shall be Type L02161.

Lever extension flush bolts shall be type L04081.

Metal thresholds shall be Type J16130.

Door protection plates including armor, kick, and mop plates shall be provided for all doors subject to cart traffic and other impacts. Door protection plates shall be stainless steel, type J102 and J103 finish to match the finish of the door lock.

All exterior doors shall have aluminum housed type weather seals.

All fire and smoke rated doors shall have compression type seal gasketing. All fire rated doors from offices or office suites opening onto corridors shall have magnetic hold-open devices activated by a smoke detector or the fire alarm system to close the door.

Door floor stop and holder shall be Type L01371.

All sound rated doors shall have sound seals and automatic door bottoms.

All exterior doors shall have a metal thresholds shall be Type J16190.

All exterior doors shall have a metal thresholds shall be Type J16190.

All doors identified to be insulated shall have weather seals.

1.7.12 Finishes

Door hardware finish shall match satin stainless steel Type 630.

1.7.13 Door Hardware

1.7.13.1 Hardware Requirements

Door hardware in fire rated walls shall comply with NFPA and other applicable criteria.

1.7.13.2 Hardware Sets

The following hardware sets listed are the minimum functional hardware requirements for each door types. Additional hardware may be required for each door type beyond that listed below.

a. Exterior Aluminum Doors

All single exterior personnel doors at Vestibules shall have the following hardware features:

Grade 1 hinges - Stainless Steel or as standard with mfr.

Exit device, Type 6 or 8,Function 13
Overhead closer - Type C02021
Overhead holder stop
Floor Stop
Weatherstripping
Threshold
Kick plate
Rain drips
Exterior Push Button Coded Mechanical Cypher Lock - coordinate with exit device
Magnetic Lock with remote locking/unlocking capabilities from Dispatch/911 - Vestibule 119 only
Provide close circuit television camera at doors to monitor in Dispatch/911 Center - See Section 01007

Main Entry double Vestibule #101 Door shall have the following hardware features:

Grade 1 hinges - Stainless Steel or as standard with mfr.
Exit device Type 6 or 8, - Function 01, pull/dummy trim lever) on one leaf
Exit device Type 06 or 08, - Function 02 (with integral mechanical push button coded cypher lock, (Hex key dogging during business hours. Access control by remotely controlled magnetic lock during business hours)

Exterior Push Button Coded Mechanical Cypher Lock - coordinate with exit device
Magnetic Lock with remote locking/unlocking capabilities from Dispatch/911
Provide close circuit television camera at doors to monitor in Dispatch/911 Center
Overhead closers, - Type C02021 (each door)
Overhead holder stop (one each door)
Floor Stop (1 each door)
Weatherstripping (each door)
Threshold - continuous
Kick plates
Rain drips

b. Insulated Exterior Hollow Metal Doors

(1) All single exterior personnel doors (exterior personnel doors at Apparatus Bays) shall have the following hardware features:

Grade 1 hinges

Exit Device, Type 3, F_08,Mortise Device (Type 3, Function 01 on doors designated as exit only).
Cypher Lock (except those designated as exit only) - No remote locking/unlocking capabilities
Overhead closer - Type C02021
Wall or Floor stops
Overhead holder stop
Kick plate
Weatherstripping
Threshold
Rain drips

(2) All double exterior Mechanical room, Electrical room and Storage Room doors shall have the following hardware features:

Grade 1 hinges
Mortise lockset hardware F07(key locking capabilities on active leaf)
Overhead closer - Type C02021 (active leaf)
Lever extension flush bolts (inactive leaf)
Overhead holder stop (active leaf)
Wall or Floor stops (active and inactive leaf)
Kick plates
Weatherstripping
Rain drips
Thresholds

c. Interior Doors

(1) All single doors used in Offices, Conference room, Library/Crew Meeting room, Janitor's Closet, Storage rooms, Fire Gear Cleaning, Disinfection/EMS Decon Room, Wet/Dry Chemical Fire Extinguisher Maintenance, shall have the following hardware features:

Grade 1 hinges
Mortise lockset hardware (key locking capabilities - avoid self locking hardware.)
Overhead closer - Type C02021 (as required)
Kick plate
Wall stops (with holder where appropriate)
Gaketting (as required)

(2) All double doors in the path to the Apparatus Bays shall have the following hardware features:

Grade 1 hinges
Surface vertical rod exit devices
Overhead closer - Type C02021 (both leafs)
Kick plates
Wall stops or Floor stops (with holder where appropriate)

(3) All single doors from the Operations/Sleeping Area to the Apparatus Bay shall have the following hardware features:

Grade 1 hinges
Surface vertical rod exit devices
Overhead closer - Type C02021
Kick plates
Overhead holder stop

(4) All single doors from the Apparatus Bays to the Fire Gear Cleaning Room, Disinfection/EMS Decon Room, Wet/Dry Chemical Fire Extinguisher Maintenance shall have the following hardware features:

Grade 1 hinges
Mortise lockset hardware (key locking capabilities - avoid self locking hardware.)
Overhead closer - Type C02021
Kick plates
Wall stops or Floor stops (with holder where appropriate)

(5) All single doors into Dorm rooms shall have the following hardware features:

Grade 1 hinges
Mortise privacy lockset hardware
Overhead closer - Type C02021
Wall stop
Kick plate
Gaketting

(6) All single doors in Library/Crew Meeting Room, Dining room, and Day room shall have the following hardware features:

Grade 1 hinges
Mortise Lockset F04
Overhead closer
Wall stop
Kick plate
Gaketting

(7) All single doors in Toilet, Sink, and Shower/Locker rooms shall have the following hardware features:

Grade 1 hinges
Mortise privacy lockset hardware
Overhead closer (as required
Wall stop
Kick plates

(8) All single doors into single water closet toilets shall have the following hardware features:

Grade 1 hinges
Mortise privacy lock hardware
Overhead closer
Wall stop
Kick plates

(9) All closets with bi-folding doors shall have the following hardware features:

Hook lock hardware standard for bi-folding doors.

(10) Single full glass door into Conference Room and from administrative area to Operations/Sleeping area shall have the following hardware features:

Grade 1 hinges
Cypher lock hardware
Magnetic Lock with remote locking/unlocking switch on Dispatch/911 Center unit console
Overhead closer
Wall stop
Kick plate
Sidelite

(11) Single door to Dispatch/911 Center from Entry Corridor shall have the following hardware features:

Grade 1 hinges
Mortise Lockset F04
Mechanical Cypher Lock
Magnetic Lock with remote locking and unlocking capabilities from

Dispatch/911 Center
Overhead closer
Wall stop
Kick plate
Gaketting

(12) Double Door from Apparatus Bay to Storage Room shall have the following hardware features:

Grade 1 hinges
Mortise lockset hardware F07(key locking capabilities on active leaf)
Overhead closer - Type C02021 (active leaf)
Lever extension flush bolts (inactive leaf)
Overhead holder stop (active leaf)
Wall or Floor stops (active and inactive leaf)
2 ea. Kick plates

(13) Interior Single Vestibule Doors shall have the following hardware features:

Grade 1 hinges - Stainless Steel or as standard with manufacturer
Overhead closer/holder - Type C02021
Wall or Floor stops
Kick plate
Weatherstripping
Threshold
Extended Pull Bar - J503
Push Bar - J501

(14) Interior Pocket Door shall have the following hardware features:

Heavy Duty Sliding Pocket Door Hardware

1.7.14 Key Storage System (Cabinet)

A surface mounted wall mounted key cabinet shall be provided in the Captain's Office #159, and contain all additional keys for all areas of this building. Cabinet shall have the capacity to store a minimum of two keys for each room on an individual key hook plus an additional capacity of 25 percent. Key hooks shall be mounted on panels with sufficient distance between hooks that will allow easy identification and removal. Cabinet key panels shall be readily removable and capable to insert additional panels for expansion needs. Key cabinet shall have key locking capabilities. Cabinet door shall be a full height piano hinge.

1.7.15 Not Used

1.7.16 Aluminum Window Frames and Entrances

Information regarding aluminum windows shall be referenced to the Unified Facilities Guide Specifications, SECTION 08520A, ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS for design criteria and minimum quality requirements.

Due to Anti-Terrorism/Force Protection requirements for this facility, all exterior window frame units shall have a frame system designed to prevent window and glass assembly from dislodging from the wall construction and window frame in a blast event. The framing shall be specially designed to have a 1-inch "bite" on the glass. Frame shall be anchored accordingly.

Added bars are not acceptable.

Window manufacturer shall specialize in designing and manufacturing the type of aluminum windows specified in this section, and shall have a minimum of 10 years of documented successful experience. Exposed surfaces of aluminum windows shall be finished with anodic coating conforming to AA DAF-45: Architectural Class I, AA-M10-C22-A44, color anodic coating, 0.7 mil or thicker. Aluminum window shall generally be 3'-4" wide by 3'-4" high and in the arrangement indicated on the drawings.

Windows construction shall consist of an aluminum frame with a continuous thermal break. All windows shall be operable and shall include insect screens. Performance rating of these windows shall be a HC 65 or greater in accordance with performance rating testing with AAMA 101. Windows shall have a U value of not greater than 0.50 and a solar heat gain coefficient of 40 or less. These windows shall include a 1-inch minimum insulated glazing unit as specified in Section 08810A, GLASS AND GLAZING and further defined herein. Window frames shall have a color anodized finish.

Windows at the roof monitor/clerestory (option) at the Apparatus Bays shall be operable and "entry tower and lantern" element (option) shall be fixed. All shall be insulated translucent sandwich wall panel assemblies in aluminum frames. Panels shall be thermally broken assemblies, 2-3/4" thick, have a U-value of .23 BTU/(hr*ft2*F), and allow a minimum of 30% light transmission. Panels will be shatterproof, will not discolor or fade, shall maintain bond integrity for 20 years. Frames shall be finished to match other window frames in conformance with the Fort Carson Installation Design Guide.

Window assemblies for the Dispatch/911 Center shall be fixed bullet resistant in accordance with NFPA 1221.

1.7.17 Aluminum Storefront/Window Wall as applicable

Aluminum storefront or window wall shall be used for the glazing of the Dining Room, Library/Crew Meeting Room, and various corridor locations. The storefront/window wall shall match all the performance specifications for aluminum windows.

1.7.18 Interior Windows

Interior windows shall consist of pressed steel frame sections with applied stops and shall be provided to increase the amount of day lighting into rooms and for visual control. The glass shall be 1/4-inch, clear, laminated type, and fire rated where required.

Window assemblies for interior windows of the Dispatch/911 Center as applicable shall be bullet resistant in accordance with NFPA 1221.

1.7.19 Glass and Glazing

1.7.19.1 Insulated Laminated Glass

Information regarding glass and glazing shall be referenced to the unified Facilities Guide Specifications, SECTION 08810A GLASS AND GLAZING for design criteria and minimum quality requirements.

Due to Force Protection requirements for this facility, all exterior insulated glazing units will require the inner glass unit be a laminated

thermally tempered type glass. All exterior glazing units shall be installed in a manner which prevents the window and glass assembly from dislodging from the wall construction and window frame. A "wet" glazing method which provides a completely filled and continuous sealant glazing and continuous sealant bond between the glazing unit and frame will be used. Glazing colors shall be tinted in conformance with the Installation Design Guide. All exterior glazing units shall be a Low-E type units.

1.7.19.2 Insulated Laminated Glass- Low-E Unit

Insulated laminated type glass for door and window applications shall be a minimum of 1-inch thick. Glass panel shall consist of two - 1/4-inch glass panes separated by a 1/2-inch air space and hermetically sealed. Glass for exterior lite shall be Type I annealed glass, Class 1- clear, Quality q3- glazing select low "E" and laminated glass for the interior lite. All insulated glazing units shall be tinted light blue-green. Glass shall not be reflective. See also requirements for windows and glass.

1.7.19.3 Glass Mirrors

All glass mirrors shall be Type I transparent flat type, Class 1-clear and 1/4-inch thickness.

1.7.19.4 Laminate Glass

Laminated glass for interior applications such as interior door side-lites shall be Class 1- clear, Condition A uncoated surface, Quality q3- glazing select. Laminate glass shall consist of two layers of Type I transparent heat strengthen glass bonded together with a PVB plastic inter layer.

1.7.19.5 Bullet Resistant Glass

Bullet resistant glass shall be in accordance with the requirements of NFPA 1221 to resist medium power small arms, high power small arms, super power small arms, and high power rifles as specified in ANSI/UL 752.

1.7.20 Gypsum Wallboard and Steel Studs

Information regarding gypsum board and steel studs and furring shall be referenced to the Unified Facilities Guide Specifications, SECTION 09250, GYPSUM BOARD for design criteria and minimum quality requirements.

Manufacturer shall have specialized in the manufacturing of these material products for a minimum of 10 years of documented experience.

Installer shall have a minimum of 5 years of documented experience.

All gypsum wall board shall be a minimum of 5/8-inch thick, and meet the requirements of ASTM C 36, ASTM C442, ASTM C 475, designed with a minimum 10 psf and a deflection of L/240. Gypsum wallboard partitions shall be type "X" fire rated where required for partitions where one or two-hour fire resistant construction is required or shown. All walls or partitions that are shown or required to be fire rated and/or sound rated shall extend to the underside of the roof or floor deck above. All walls or partitions that do not extend to the underside of the roof or floor deck shall terminate not less than 6-inches above the ceiling and be braced from the top of wall to structure above as required to meet minimum deflection requirements specified herein. Wall terminating at the underside of decks and walls that are braced overhead shall accommodate deflection in the structure above and

the termination shall maintain fire, smoke, and sound ratings. Acoustical sealant and fireproofing shall be as required.

All steel studs shall be placed at a maximum distance 16-inches on-center maximum and shall be sized, braced, and gaged according to the wall heights required. Manufacturer's requirements shall be consulted with regard to unbraced length.

Steel studs in exterior walls supporting masonry and other exterior wall material shall be spaced and have a gage that will have a maximum deflection of L/600 (per Technical Note 28B, page 9, by the Brick Institute of America) under full wind load as calculated by the criteria defined in Section 01005: Structural Requirements.

Predecorated gypsum wallboard is not acceptable.

Exterior gypsum soffit board is not acceptable.

Water-resistant gypsum backing board used as a substrate to receive ceramic tile is not acceptable.

Steel studs to receive ceramic wall tile shall be a minimum of 20 gage and as recommended by the Tile Council of America for bracing, spacing, and thickness.

See paragraph 1.5.4, Interior Wall Finishes for level of gypsum wallboard finish.

1.7.21 Tile

Information regarding floor and wall tile shall be referenced to the Unified Facilities Guide Specifications, SECTION 09310, CERAMIC TILE, QUARRY TILE, AND PAVER TILE for design criteria and minimum quality requirements.

Floor tile in toilets, vestibules, and other locations indicated shall be installed in accordance with Tile Council of America (TCA) method F112. Floor tile in showers and shower drying areas shall be installed in accordance with Tile Council of America (TCA) method B415.

Wall tile in Toilets, Shower/Locker rooms, and Sink areas shall be installed in accordance with Tile Council of America (TCA) method W202 or or W244. Organic adhesive shall not be permitted.

Marble or natural stone thresholds shall be provided at all flooring transition locations involving tile and different materials.

1.7.22 Ceilings

1.7.22.1 Gypsum Board Ceiling

All gypsum wallboard ceilings shall have a light textured finish except in the toilets, showers, locker rooms, laundry room, and janitorial closets. Ceiling in the toilets, shower/locker rooms, laundry room, and janitorial closets shall have a smooth gypsum board ceiling. All gypsum wallboard ceilings in showers areas shall be water resistant gypsum wallboard. Provide support framing spaced at not more than 12-inches apart and as required to adequately support water-resistant gypsum wallboard ceilings.

1.7.22.2 Acoustical Tile Ceiling

Information regarding acoustical ceilings shall be referenced to the Unified Facilities Guide Specifications, SECTION 09510, ACOUSTICAL CEILINGS for design criteria and minimum quality requirements.

Acoustical ceiling system shall be a 24-inches x 24-inches exposed grid type. Acoustical panels shall have a square edge and recessed where the exposed grid system supports the panels. Characteristics of the acoustical panels shall consist of: textured surface, high density material to resist impact damage, non perforated tile with a textured finish. Acoustic tile ceiling shall conform to the Fort Carson Installation Design Guide standard.

Acoustical units shall have a NRC grade of 0.50 to 0.60 when tested in accordance with ASTM C423, a CAC (Ceiling Attenuation Class) range of 40-44 when tested in accordance with ASTM E1414, and LR of 0.75 to 0.80.

1.7.23 Painting, General

Information regarding painting shall be referenced to the Unified Facilities Guide Specifications, SECTION 09900, PAINTS AND COATINGS for design criteria and minimum quality requirements.

1.7.23.1 Surfaces to Receive Stain or Paint

A semi-gloss enamel paint shall be on all exposed wall surfaces to be painted, except mechanical, electrical and communication rooms. A semi-gloss enamel paint shall be used on all mechanical, electrical, communication, and janitor closet walls.

The Disinfecting/EMS Decontamination room shall have an epoxy coating on the floors and on the walls up to 9'-0" above finish floor.

All gypsum wallboard ceilings shall receive a semi-gloss enamel paint finish.

Interior wood trim shall receive a stain and clear polyurethane finish.

Exposed masonry walls to be painted shall receive a latex filler coat, one coat of primer and two coats of semi-gloss paint. Concrete or masonry in unexposed locations shall receive a coat of latex filler, one coat of primer, and two coats of semi-gloss paint.

Steel roof deckand structural elements shall receive a semi-gloss paint finish.

1.7.23.2 Surfaces Not to be Painted

Surfaces in the following areas are not to be painted:

Concrete or concrete masonry units that are integrally colored or in unexposed areas.

Concrete floors - except where noted and under the raised floor system.

Metal surfaces of aluminum, stainless steel, chromium plate, bronze, copper and similar finish materials and all factory finished items.

Jacketing over pipe insulation in unexposed locations that do not require

color coding.

Surfaces of hardware, fittings, sprinkler heads, fire protection equipment and other factory finished items not requiring a painted finish.

Glass, wall covering and other finish surfaces.

1.7.24 Metal Lockers

A. (Personnel) Metal lockers shall be standard lockers that are 12-inches wide x 12-inches deep x 72" high (36" per tier). Lockers shall be prime, high grade Class I annealed, cold rolled steel free from surface imperfections. All fasteners shall be zinc plated. All lockers shall be preassembled with all joints welded. No bolts, screws, or rivets shall be used in the assembly of the locker bodies. Lockers shall have 16 gage bodies. Locker tops to be sloped. Lockers shall be provided with solid panels and ventilation louvers in the doors. Doors shall be equipped with a device to receive a padlock. Metal shall be cleaned, rust inhibitive treated, and finished with a high quality enamel that is baked on. Accessories shall include upper storage shelves and coat hooks.

B. (Fire Fighting Gear) Fire Fighting Gear Lockers shall be heavy duty mesh/ventilated lockers, 2 tier, 18" x 18" x 72" each (each tier is 36" high).

1.7.25 Exterior Signage

Information regarding exterior signage shall be referenced to the Unified Facilities Guide Specifications, SECTION 10430, EXTERIOR SIGNAGE for design criteria and minimum quality requirements, and the requirements of the Installation Design Guide at Fort Carson.

Building number signage shall be cast aluminum material in a helvetica medium style, located at the building main entrance on the east side and the secondary entrance on the north side.

Building number signage shall be 8-inches tall, satin-finished brushed aluminum, and mounted at approximately 8'-8' above the finish floor. All signage shall be in accordance with the Fort Carson Installation Design Guide. Coordinate with the Department of Public Works at Fort Carson.

Door numbers signage shall be cast aluminum in a helvetica medium style, located above each door of the apparatus bay, centered over each overhead sectional door . Door number signage shall be 12-inches high, satin-finished brushed aluminum, centered above door. Coordinate with the Department of Public Works at Fort Carson.

1.7.26 Toilet Accessories

Information regarding toilet accessories shall be referenced to the Unified Facilities Guide Specifications, SECTION 10800, TOILET ACCESSORIES for design criteria and minimum quality requirements.

1.7.26.1 Accessory Types

Shelving for janitor closets shall be constructed using plastic laminate over plywood with wood support brackets, also a 18 gauge stainless steel, satin finish shelf integral 4 mop holder and 5 hook brackets shall be supplied.

Toilet partitions, and urinal screens shall be made of stainless steel . Toilet partitions shall be floor mounted with overhead bracing.

Paper Towel Dispenser / Waste Receptacle (PTDWR)shall be a fully recessed unit suppling multi-fold paper towels. The cabinet shall have a concealed tumbler key lock. Unit shall have a 10 gallon minimum removable molded plastic insert.

Grab Bar (GB) shall have concealed mounting flange with set screw mounting holes concealed on the lip of the flange. Grab bars shall have a peeled non-slip surface.

Soap Dispenser (SD) shall be the liquid type pump type with a minimum 34 fluid ounce capacity. Dispenser shall be mounted on the lavatory fixture.

Mirror Glass(MG) mirrors shall be a minimum of 16-inches wide by 20-inches deep and shall be installed over each lavatory, see drawings for locations. A full length 20-inches X 6'-0" mirror shall be installed in each locker room, see drawings for location. Tilting type mirrors sized which meet American With Disabilities Act standards shall be installed in the handicapped toilets and over any handicapped lavatory. The west wall of Physical Fitness #171 shall have a floor to ceiling mirror installed on the west wall.

Toilet Tissue Dispenser (TTD) shall be a double roll dispenser with a recessed holder, integrated into the toilet partitions where applicable.

Sanitary Napkin Dispenser (SND) shall be wall mounted and mounted in Women's Toilet #160.

Sanitary Napkin Disposer (SND)shall be installed where indicated.

Soap Holder (SH) shall be tile and integral with shower tile.

Robe Hook (RH) shall be a double hook with a 4 inches wide stainless steel bar mounted horizontally that forms a hook at each end. Flange approximately size is 2-inches x 2-inches. Unit extends approximately 2-inches from the wall.

Shower enclosures shall be full height ceramic tile on concrete backer board with a terrazzo shower basin, and drain.

Shower Rod & Curtain - shower curtain rod (SCR) shall be type 304 stainless steel straight rod. Shower curtain (SC) shall conform to CID A-A-2398.

1.7.26.2 Toilet Accessory Finishes

Finishes shall match stainless steel, Type 304.

1.7.26.3 Miscellaneous Accessories

Shelf & Holder- a single mop broom holder with a metal self and bracket shall be provided in the Janitor Closets. Units shall be approximately 34"(w) x 16" (h) x 8" (d), fabricated of 18 gauge, Type 304 stainless steel with #4 satin finish. The unit shall have 4 metal hooks and 3 mop holders.

1.7.26.4 Toilet Accessories Requirements

Fire Chief's Toilet #126 shall have toilet accessories as follows:

1 Mirror (above counter)
1 Toilet Tissue Dispenser
1 Towel Bar
1 Robe Hook
1 Paper Towel Dispenser/ Waste Receptacle
1 Full Height Mirror
1 Shower Curtain and 1 Shower Curtain Rod

Dispatch/911 CenterToilet #110
1 Mirror (above counter)
1 Toilet Tissue Dispenser
1 Towel Bar
1 Robe Hook
1 Paper Towel Dispenser/ Waste Receptacle
1 Sanitary Napkin Disposer

Public (Handicapped) Toilet #112
1 Tilted Handicapped Mirror
2 Grab Bars
1 Toilet Tissue Dispenser
1 Sanitary Napkin Disposer
1 Paper Towel Dispenser/ Waste Receptacle

Men's Showers/Lockers #156
3 Towel Bars
6 Robe Hooks
6 Shower Curtains and 6 Shower Curtain Rods
3 Fold-down Benches in showers
14 Personnel Lockers

Men's Sinks # 157
1 Large Mirror
2 Liquid Soap Holders
2 Paper Towel Dispensers/Waste Receptacles

Men's Toilet #158
3 2-Roll Toilet Tissue Dispensers
3 Robe Hooks (on toilet partition doors)

Janitor Closet #159
1 Floor Mop Sink
1 Shelf with Mop Holders

Women's Toilet #160
1 Large Mirror
1 Liquid Soap Dispensers
1 Paper Towel Dispenser/ Waste Receptacle
1 Sanitary Napkin Dispenser
1 Sanitary Napkin Disposer
1 2-Roll Toilet Tissue Dispensers
1 Robe Hooks (on toilet partition doors)
4 Personnel Lockers

Women's Shower #161
1 Towel Bars
2 Robe Hooks
2 Shower Curtains and 2 Shower Curtain Rods

1.7.27 Fire Extinguishers and Cabinets

Information regarding fire extinguishers and cabinets shall be referenced to the Unified Facilities Guide Specifications, SECTION 05500 MISCELLANEOUS METALS, for design criteria and minimum quality requirements. Furnish additionally a (5-pound) fire extinguishers (type meeting the code and hazard requirements of the space) sized to fit into the fire extinguisher cabinets selected.

Fire extinguisher cabinets shall be fully recessed type where wall construction allows or a semi-recessed type based on wall construction with a flat metal door. Fire extinguisher cabinets shall be sized to accommodate a 5 pound fire extinguisher cabinet. Clear plastic bubble type door fronts are not acceptable. Each fire extinguisher cabinets shall hold a 5 lb type ABC extinguisher. The fire extinguisher cabinets shall be located in accordance with NFPA Life Safety Code #101, and NFPA #10. Fire extinguisher cabinets shall be brushed aluminum finished.

Fire extinguisher cabinets shall not be located on any walls designated with STC requirements.

1.7.28 Casework, Cabinets & Countertops

Information regarding cabinets and countertops shall be referenced to the Unified Facilities Guide Specifications, SECTION 06410A, LAMINATE CLAD ARCHITECTURAL CASEWORK for design criteria and minimum quality requirements with additional requirements added to specifications to obtain commercial premium grade architectural woodwork, base and wall cabinets, and countertops. Solid surface countertops shall be provided for all countertops and shall be referenced to the UFGS Section 06650 SOLID POLYMER (SOLID SURFACING) FABRICATIONS for design criteria and minimum quality requirements.

All cabinet construction shall meet the requirements of the Architectural Woodwork Institute, Quality Standards. Cabinets shall be provided where indicated on the drawings. Cabinets shall be standard, factory-manufactured products of modular cabinets suppliers or custom-built units. Frame type cabinets shall be supplied. Top and bottom corners shall be braced with either hardwood blocks that are glued together with water resistant glue and nailed in place, or metal or plastic corner braces. All cabinets shall be constructed of solid wood or five-ply plywood. The cabinet construction frame and doors shall meet minimum premium grade requirements set forth in AWI, Architectural Woodwork Institute, Quality Standards. All points of hardware attachment (e.g. screws, hinges) must be inserted into solid wood lumber. The finish of all exposed exterior cabinets, door surfaces shall be plastic laminate. All counter tops shall be solid polymer resin. The finish of the interior cabinets, shelving, and interior door surfaces shall be plastic laminate.

Doors- shall be finished with plastic laminate and shall be approximately 1/2-inch thick.

Drawers will have side guides with an automatic stop feature. Sides and bottom will be constructed of 3/8-inch thick hardwood or plywood. Drawer fronts shall be removable and replaceable. All drawers shall be dove-tail jointed.

Solid Surface Countertop- shall consist of solid polymer material composed of acrylic polymer, mineral fillers, and pigments. Countertops shall have a semi-gloss finish. Countertop material shall have a minimum 1/2 inch thickness and be continuously supported with particle board. Countertop material of 3/4 inch thickness shall not require continuous supported particle board material. Sinks shall have an under mount installation and all exposed countertop edges shall have a decorative grooved edge treatment. Backsplashes hall be a 1/4 inch thick solid surface material which matches the countertops.

Solid Surface Material Characteristics:
color and pattern continuous all through the material,
material shall not delaminate with age,
installation joints shall be seamless in appearance,
shall not be porous and resist stains,
shall resist fractures, chipping and cracking,
have the ability to remove minor cuts and scratches with fine sand paper and restore it to the original condition,
Class I flammability rating,
vanity tops and bowls shall be fabricated in one unit (when possible),
sinks with exposed lips and grout joints is considered unacceptable.

All exposed edges of the countertops shall be rounded.

Cabinet hardware finishes shall match stainless steel, Type 304. Door hardware shall be as follows:
door pulls- shall be similar to BHMA D1791,
door hinges- a minimum of two concealed hinges with each door (similar to BHMA B01501),
door latch- a magnetic door catch, similar to BHMA B03141 for each door,
mirrors- shall extend for top of backsplash to 7 ft.

1.7.28.1 Cabinet, Closets, Countertops, Vanity Requirements

A. Typical Dorm room Locker

Wood shelf at top of the unit (hat shelf)
Metal closet clothing bar similar to BHMA L03141
Wood bottom drawer
Lockable wood door concealed hinges

B. Typical Dorm room Writing Counter

Plastic laminate counter top
Solid casework box above with adjustable shelf
Under shelf task lighting above the work surface

C. Secretary/Receptionist Counter #103

Reception desk/counter in Secretary/Receptionist Area #103, unit shall include: adjustable keyboard, pencil drawer, minimum 2 pedestals, task lighting along length on one of the work surfaces, sitting height work surface, handicapped height counter segment, and a transition counter at standing height for visitors. Counters shall be constructed of a solid polymer material.
Solid surface polymer writing surface and elevated countertop
Adjustable keyboard

Pencil drawer
2 Legal File Cabinet Drawers minimum
Task lighting
Minimum of 2 pedestals
Transition counter
Handicapped Height Counter

D. Dorm Room Closets

Wood shelf running the entire length of closet
Metal closet clothing bar similar to BHMA L03141

E. Wood Storage/Wardrobe Cabinets

Wood veneer lockable doors with concealed hinges
Plastic laminated covered shelves (5 total) with 75 lb capacity each

F. Kitchen Cabinets, Room #167

Solid surface polymer countertop
Cabinet draws, cabinet doors, and overhead doors are to be aligned
Door shall be plastic laminate covered with concealed hinges
Overhead cabinets shall be 12-inches deep
Space above cabinets and ceiling shall be filled with gypsum board soffit
Backsplash and countertop shall be integral
Provide one door pull per cabinet door and drawer
Provide magnetic catch for each door
Contractor shall coordinate kitchen cabinet design with kitchen appliances
Each overhead cabinet shall have 2 adjustable shelves
Each under counter cabinet shall have one adjustable shelf
Cabinets shall be adjusted for under counter microwave unit

G. Kitchen Island/Peninsula Cabinets

Solid surface polymer countertop
Cabinet drawers, cabinet doors are to be aligned
Door shall be plastic laminate covered with concealed hinges
Provide one door pull per cabinet door and drawer
Provide magnetic catch for each door
Contractor shall coordinate kitchen cabinet design with kitchen appliances
Each under counter cabinet shall have one adjustable shelf
Cabinets shall be adjusted for under counter microwave unit

H. Countertop Eating Area

Solid surface polymer countertop
Provide clear plastic protection plates to prevent scuffing of the casework. Protection plates shall run from floor to the underside of the countertop.

I. Laundry Counter, Room #155

Solid surface polymer countertop
Backsplash and countertop shall be integral
Countertop shall be without drawers or doors under the counter

All structural supports shall be concealed within the counter design
Counter shall be able to support 70 lbs

J. Toilets

Solid surface polymer countertop
Cabinets shall meet handicapped requirements where applicable
Backsplash and countertop shall be integral

1.7.29 Miscellaneous Equipment

1.7.29.1 Recessed Floor Mat and Frame

Information regarding floor mats and frames shall be referenced to the Unified Facilities Guide Specifications, SECTION 12675, RECESSED FLOOR MAT AND FRAME for design criteria and minimum quality requirements.

Entire floor mat and frame shall be fully recessed and flush with adjacent surfaces. The frame shall be constructed of aluminum extrusions and secured to the floor. The mat shall consist of carpet inserts with continuous interlocking treads which allows for easy roll-up. Floor mat size shall be approximately as shown on the drawings.

1.7.29.2 Marker Board

Marker board size shall be 4'-0" x 6'-0" in Dispatch/911 Center and 4'-0" x 8'-0" in Conference Room and Library/Crew Meeting Room. Marker board writing surface shall be composed of porcelain enamel fused to nominal 28 gage thick steel. A 2-inch oak perimeter frame shall be provided. Marker board shall be in accordance with Unified Facilities Guide Specification - Section 10100, Visual Communication Specialties

1.7.29.3 Raised Floor System

Information regarding floor panels shall be referenced to the Corps of Engineer Guide Specifications, SECTION 10270, RAISED FLOOR SYSTEM for design criteria and minimum quality requirements.

A. A 12-inch high raised floor system shall be provided in the Dispatch/911 Center as shown on the plans. The proposed floor panels shall require a pedestal and stringer support system.

B. Floor panels shall be capable of supporting 1500 pounds concentrated load without permanently deflecting per UFGS Guide specifications.

C. Floor panels shall be die-cast or extruded aluminum over a pedestal and stringer support system. Panel sizes shall be 2 foot width x 2 foot length. Finished surface of raised floor system shall be finished with floor surfacing materials to match adjacent floor surfaces. Floor finish shall be removable carpet tiles.

D. Flooring shall comply with conductive surfacing requirements.

1.7.29.4 Wall and Corner Protection

Integrally colored vinyl corner protection corner guards shall be a minimum of 3-inches x 3-inches x 6'-0" high and include aluminum retainer, end and closure caps, and accessories. Coordinate the color of the corner guards

with the interior color scheme.

Stainless steel corner guards at concrete masonry units shall be a minimum of 4-inches x 4-inches x 6'-0" high.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01006

MECHANICAL REQUIREMENTS

1.12.4 Ductwork
1.12.5 Variable-Air Volume Boxes
1.12.6 Ceiling Mounted Supply Diffusers
1.12.7 Ceiling Mounted Return Grilles
1.12.8 Supply and Exhaust Fans
1.12.9 Outdoor Intakes and Exhausts
1.12.10 Special Requirements
1.12.10.1 Toilets/Locker Rooms
1.12.10.2 Janitor's Closets
1.12.10.3 Mechanical Equipment Rooms
1.12.10.4 Boiler Room (Mechanical room)
1.12.10.5 Laundry Room Exhaust
1.12.10.6 Not Used
1.12.10.7 General Ventilation Vehicle Exhaust System
1.12.10.8 Communication/radio communication rooms, Electrical/UPS room,
1.13 CHILLED WATER SYSTEMS
1.13.1 Refrigeration System.
1.13.2 Filtration.
1.13.3 Other Systems
1.13.4 Chilled Water Distribution Pumps
1.14 BUILDING TEMPERATURE CONTROL SYSTEMS
1.14.1 General DDC Requirements
1.14.2 Existing Williams Electric Company EMCS Interface
1.14.2.1 Not Used
1.14.2.2 Controllers
1.14.2.3 Digital Controllers
1.14.2.4 Stand-Alone Operation
1.14.3 Input/Output Devices
1.14.4 Analog Sensors, Digital inputs & Digital outputs
1.14.5 Cable and Wiring
1.14.6 Control Valves
1.14.7 Variable Air Volume Boxes
1.14.8 Damper Actuators
1.14.9 Valve Actuators
1.14.10 HVAC Control Drawings
1.14.11 Control Schematic
1.14.12 Elementary Diagram
1.14.13 Sequence of Control
1.14.14 Description of Components
1.14.15 Control Panel Detail
1.14.16 Legends and Schedules
1.15 TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS
1.16 TECHNICAL SPECIFICATIONS
1.17 ENERGY USE BUDGET (EUB) COMPLIANCE CHECK
1.17.1 Computer Simulation
1.17.1.1 Acceptable Engineering Procedures
1.17.1.2 Capable of Change
1.17.1.3 Cooling and Heating Loads Influencing the Building Design
1.17.1.4 Alternatives
1.17.2 NOT USED
1.17.3 Summary Report
1.18 TRAINING
1.18.1 Training Course Content
1.19 NOT USED
1.20 NOT USED
1.21 COMMISSIONING OF HVAC SYSTEMS
1.22 FOOD SERVICE EQUIPMENT
1.23 EMERGENCY GENERATOR

SECTION 01006

MECHANICAL REQUIREMENTS

PART 1 MECHANICAL REQUIREMENTS

1.1 MECHANICAL SYSTEMS CRITERIA

1.1.1 General Parameters/References

Mechanical systems, including HVAC systems, plumbing, gas distribution and building temperature controls shall be designed to comply with this section and the documents listed below to the extent referenced in this section. The publications are referred to in the text by basic designation only. The most current edition shall be used, whenever a specific edition is not mentioned. The most recently published of the date shown on the cover page/advertisement date shall be used. System design allowed for the Contractors selection shall be based on the combined factors of first cost considerations and related first cost (initial/construction) limitations using the criteria listed hereafter and acceptable analytic computer systems later in this section of the Request for Proposal (RFP); The latest edition of the following standards and codes in effect and amended as of date of supplier's proposal, and any subsections thereof as applicable, shall govern design and selection of equipment and material supplied:

Air Force Manual (AFM) 88-36, Energy Monitoring and Control Systems EMCS). (http://www.usace.army.mil/inet/usace-docs/armytm/tm5-815-2/)

American Conference of Government Industrial Hygienists (ACGIH Industrial Ventilation: A manual of Recommended Practice current edition

American National Standards Institute (ANSI) publications - 61; section 8 & 9.

American Society for Testing and Materials (ASTM) International publications - A53, B19.1, B19.3, Boiler and Pressure Vessel Code Section VIII, PTC-9, PTC-10.

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):

Handbooks:

2003 HVAC Applications
2002 Refrigeration
2001 Fundamentals
2000 HVAC Systems & Equipment
1999 HVAC Applications
1998 Refrigeration
1999 HVAC Applications
1998 Refrigeration
1997 Fundamentals

1996 HVAC Systems & Equipment
1995 HVAC Applications
1994 Refrigeration
1993 Fundamentals
1992 HVAC Systems & Equipment
1991 HVAC Applications

Practices:

ASHRAE Terminology of HVAC&R, 2nd Edition, 1991.

Standards;

15-1994, Safety Code for Mechanical Refrigeration

55a-1995 Thermal Environmental Conditions for Principles of Heating, Ventilating and Air-Conditioning

62-2001 Ventilation for Acceptable Indoor Air Quality

90.1-2001 Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA COSPONSORED) (ANSI COSPONSORED); 1999 version w/12 amendments

52.1-1992 Gravimetric and Duct Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter

52.2-1999 Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

129-1997 Measuring Air-Change Effectiveness.

American Society of Mechanical Engineers (ASME)International, 22 Law Drive, P.O. box 2900, Fairfield, N.J. 07007-2900, A17.1 Safety Code for Elevators & Escalators, ASME, 1996; B36.10, 61; section 8 & 9, Z83.6.

Army Technical Instructions TI 809-04 Seismic Design for Buildings, dated December 1998.

Energy Policy Act of 1992 (Public Law 102-486).

Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, dated March 8, 1994.

Executive Order 13123, Greening the Government Through Efficient Energy Management dated 3 June 1999.

Gas Institute Compressed Air (GACI)-Compressed Air and Gas Handbook current edition

Instrument Society of America Standard (ISA S7.3, S75.01).

National Fire Codes (NFPA):

13 Installation of Sprinkler systems
30 Flammable and Combustible Liquids Code
37 Stationary Combustion Engines and Gas Turbines
54 National Fuel Gas Code

70 Nation Electrical Code
72 National Fire Alarm Code
90A Installation of Air Conditioning and Ventilating Systems
91 Exhaust Systems for Air Conveying of Gases, etc.
96 Ventilation Control and Fire Protection of Commercial Cooking Operations
211 Chimneys, fireplaces, Vents and solid Fuel Burning Appliances
1404 Fire Department Self-Contained Breathing Apparatus
1500 Fire Department Occupational Safety and Health Program
1581 Fire Department Infection Control Program

International Sanitation Foundation (NSF)Section 8 and 9

SMACNA - HVAC Systems - Duct Design, 1990.

SMACNA -HVAC Duct Construction Standard - Method and Flexible, 2nd Edition1998.

Title 10 CFR, Part 435, Subpart A, pages 4535-4720 inclusive, Energy Conservation Voluntary Performance Standards for New Commercial and Multi-family High Rise Residential Buildings, Mandatory For New Federal Buildings Published January 30, 1989.

Title 10 CFR Part 436 Federal Energy Management and Planning Programs, Life Cycle Cost Methodology and Procedures, January 25, 1990.

Title 40 CFR Part 112, Spill Prevention, Control and Countermeasure (SPCC) Regulation, Chapter 7, Spill Containment, dated January 10, 1974.

Underwriters Laboratories (UL 142),(UL 441).

International Plumbing Code, 2000

WinLCCID - Life Cycle Cost in Design for Windows from USACERL (Support available @ (217) 333-3977

1.2 GENERAL REQUIREMENTS

The mechanical design shall consist of heating, ventilating, and air-conditioning, gas distribution, HVAC controls, food service and plumbing. Drawings, specifications, design analysis and calculations shall be provided for both the 60 percent design and Final design submittals, and shall be in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, & SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS.

a. This chapter contains instructions and engineering requirements for the mechanical design of the following:

- Equipment Identification and Abbreviations.
- Identification of Piping.
- Seismic Protection for Mechanical Piping and Equipment.
- Thermal Insulation of Mechanical Systems.
- Plumbing Systems.
- Exterior Gas Distribution Systems.
- Interior Gas Piping Systems.
- Hydronic Heating Systems.
- Heating, Ventilating, and Air-conditioning Systems.
- Chilled Water Systems.

- Building Temperature Control Systems.
- Testing, Adjusting, and Balancing of HVAC Systems.
- Technical Specifications.
- Energy Use Budget (EUB) Compliance Check.
- Training.
- Testing.
- Commissioning of HVAC.
- Food Service Equipment
- Emergency Generator
- LIFE CYCLE COST ANALYSIS (LCAA)

b. Provide mechanical systems, complete and ready for operation. The design and installation of all mechanical systems, including manufacturer's products, shall meet the instructions and requirements contained herein and the requirements of the provided technical guide specifications. Where conflicts between these instructions and the guide specifications or criteria exist, these instructions shall take precedence. Any installation requirements within these instructions, but not contained in the specifications, shall be added to the specifications or shown on the drawings. For minimum specification requirements see paragraph TECHNICAL SPECIFICATIONS.

c. Mechanical designs shall give maximum consideration to the comfort of the occupants. The design shall also be economical, maintainable, energy conservative and shall take into account the functional requirements and planned life of the facility. Mechanical designs shall also consider life cycle operability, maintenance and repair of the facility and real property installed equipment components and systems. Ease of access to components and systems in accordance with industry standards and safe working practices is a design requirement. All like equipment and accessories shall be from a single manufacturer.

d. Standard Products - Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall be essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted.

e. Calculations shall be provided for all mechanical equipment such as boilers, air handling units, infrared heaters, heating & cooling coils, condensing units, dry coolers, unit heaters, piping, pumps, expansion tanks, supply/exhaust fans, ducts, louvers, penthouses, gas service and gas piping, plumbing, water heaters, re-circulating pump(s)and etc. Heating and cooling calculations may be provided by computer analysis i.e., Elite Software Inc., Trane Trace Load 700, Carrier E20-II Hourly Analysis Program (HAP) version 3.04 loads program etc.. Heat Loss calculation shall use actual design U-values. Add piping losses allowance of 15 percent. Design Energy Usage shall meet or be below Energy Use Budget target by ten percent (see paragraph ENERGY USE BUDGET (EUB) COMPLIANCE CHECK).

f. The existing facility's SCBA air compressor shall be relocated to the new Fire/Crash Rescue Station see paragraph GOVERNMENT-FURNISHED CONTRACTOR-INSTALLED (GFCI) SCBA COMPRESSOR SYSTEM.

g. Design Energy Usage shall meet or be below Energy Use Budget target by ten percent (see paragraph ENERGY USE BUDGET (EUB) COMPLIANCE CHECK). This shall be accomplished by increasing glazing, roof or wall insulation as necessary but, it shall not be below the level required by section 01003 ARCHITECTURAL BUILDING REQUIREMENTS. Also, develop and use building modeling and analysis techniques to establish a base case that meets the minimum prerequisite standard ASHRAE/ISNA 90.1. Then compare the baseline design energy cost budget for regulated energy components described in the requirements of ASHRAE/ISNA Standard 90.1 as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11 of that document, with the actual energy COST budget for this project in percentile. Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems, defined by the standard. Identify the percentile the actual design energy cost budget is above or below the baseline case in the design analysis.

h. "Green Buildings Technology": Mechanical equipment shall be energy efficient per Executive Order 13123 and ASHRAE/ISNA 90.1. Where products are not yet rated as energy efficient products by ENERGY STAR (Registered Trademark) the Contractor should strive to provide products that meet the above criteria and be in the upper 25 percent of energy efficiency as designated by FEMP.

1) Consider Thermal Comfort of ASHRAE 55a.

i. "Sustainable Design and Development Technology":

To the extent referenced in the solicitation, the Contractor shall provide a facility which utilizes sustainable design and development principles. Green building technology shall be incorporated into the design of this facility that will consider the use of skylights, passive solar, and solar hot water heating, and other sustainable design and development (green) technolgies and features. The basic objectives are to:

1) Reduce consumption of energy non-renewable resources.

2) Minimize waste of materials, water, and other limited resources.

3) Consider the cost of energy dollars while creating livable, healthy and productive environments that maintain comfort, health, and safety for the people using the facility.

4) This facility shall meet the requirements of achieving at least a "Bronze" rating in accordance with the Sustainable Project Rating Tool (SPiRiT), Version 1.4.1 and incorporate as a minimum the features indicated as required and to achieve a "Bronze" rating. The contractor shall provide a summary documentation of all items and categories in SPiRiT whether incorporated or not. Items incorporated in the design shall be specifically identified. This documentation will be kept up to date at the various design submittals and through construction, and shall serve as a self-assessment and record for Fort Carson.

5) Green Building Technology and Whole Building Design are referenced names involving sustainable design and development principles.

Related References:

ETL 1110-3-491 (31 January 2000) Sustainable Design for Military

Facilities

SPiRiT, Version 1.4 Sustainable Project Rating Tool, April 2001

Web Sites to Consider for Sustainable Design and Development:

EPA Designated product (available at http://www.epa.gov/cpg)

Green Building Council: http://www.usgbc.org

Whole Building Design Guide: http://www.wbdg.org/

Energy Star Building Program - Environmental Protection Agency: http:www.epa.gov/energystar/

Leadership in Energy and Environmental Design Green Building Rating System Criteria (LEED) U.S. Green Building Council: http://www.usgbc.org/programs.leed.htm

U. S. Department of Energy:

www.eren.doe.gov/buildings/build_design.html

1.2.1 Facility Descriptions

a. Fire fighters assigned to this station sleep, work, train, workout, study, recreate, cook, eat, and attend formations at this facility.

b. The facility shall be occupied (24) hours per day, (7) days per week. Mechanical rooms, exterior vestibules, janitor's closets, and storage shall be assumed as unoccupied. Backup boilers, hot water pumps and chilled water pumps shall be provided . The following areas/rooms shall be provided with the equipment indicated.

1) Unit Heaters and Exhaust Fans:

Fire Gear Cleaning room	1
Disinfection EMS/Decon	1
Breathing Apparatus room 175	1
Wet/Dry Fire Extinguisher	1
Mechanical Room	1
Mechanical/Electrical	1
Mezzanine Storage	1
Mezzanine Mechanical	1
Generator Room	1
Hazmat Storage	1

2) Infrared Heaters:

Apparatus Bays 170a-e	5

3) Suspended Ceiling Cabinet Heaters:

At the end of all corridors:
main entrance vestibule
near exterior exits and alcoves

1.2.2 Not Used

1.2.3 Design Conditions

The following conditions shall be used in designing the mechanical systems:

1. Site Elevation:

Equipment design elevation is 5840 feet above mean sea level. Appropriate corrections shall be made when calculating the capacity of all mechanical equipment installed at this elevation.

a. Latitude: 38 Deg N

b. Heating Degree Days: 6,373

2. Outside Design Conditions:

Winter: -2 °F for outside makeup air and infiltration
3 °F for transmission loads.

Summer: 90 °F DB; 60 Deg °F MCWB for building loads.
95 °F air cooled equipment.

3. Inside Design Conditions:

Winter: 45 °F for Mechanical equipment areas, generator room, hazmat storage and vestibules.

70 °F @ 35% RH for Administrative areas including Conference, fire inspector's suite, corridors, private offices, 911 dispatch center, radio communication closet, communications room, Electrical/UPS room, Kitchen, dorms, day room, library/crew meeting room, physical fitness, break room, dining room, etc. (positive pressurization); restrooms/lockers, toilets (negative pressurization).

60 °F Apparatus bays (negative pressurization) and areas requiring unit heaters

Summer: 75 °F @ 35% RH for administrative areas including Conference room, corridors, private offices, 911 dispatch center, radio communication closet, communications room, Electrical/UPS room, Kitchen, dorms, day room, library/crew meeting room, physical fitness, break room, etc. (positive pressurization); restrooms/lockers, toilets (negative pressurization)

100 °F for mechanical room, generator room, hazmat storage and mechanical/electrical but, not less than minimum ventilation requirements

100 °F Apparatus Bays and areas requiring unit heaters but, not less than minimum ventilation requirements

72 °F maximum in Communication rooms, and Electrical/UPS room,

4. Minimum Ventilation Requirements:

Apparatus Room (Vehicle Bays)	1.5 cfm per square feet supply
General	20 cfm supply of outside air per person.
Private Toilets	50 cfm per Urinal/water closet (negative pressure)
Janitor's Closets	2 cfm exhaust per square feet (negative pressure).
Toilets and Lockers	See paragraph SPECIAL REQUIREMENTS.
Mechanical equipment rooms	- 20 AC/hour.
Kitchen Hood(s)	- In accordance with ACGIH and NFPA 96.

Battery Room - 4 AC/hour and greater than the value required by paragraph BATTERY SHOP AND OTHER AREAS & system per ASHRAE Handbooks or ACGIH Industrial Handbook - A Manual of Recommended Practice
Refrigerator/Freezer room - 0.5 cfm per square foot supply air

Generator room - 15 degree delta T

Hazmat storage - 1 cfm per sq. foot

5. Cooling Loads:

Lighting/Communication/radio communication rooms, Electrical/UPS room, - Coordinate with Electrical designer (communications, radio, electrical and UPS equipment shall be assumed 100% resistive heating)
PC/monitor/printer = 400 watts total per station
People - 250 Btuh per person sensible and 200 Btuh per person latent moderately active office work per ASHRAE Handbook of Fundamentals
Physical Training - 635 Btuh per person sensible and 965 Btuh per person latent
Solar,Transmission, infiltration, etc. - ASHRAE Handbook of Fundamentals
Generator room - Coordinate with Electrical Engineer

Hazmat Storage - Actual values

6. Building Pressurization:

Entire building shall be pressurized to reduce radon. For negative pressurization see paragraph MINIMUM VENTILATION REQUIREMENTS.

7. Anti-terrorism & Force Protection:

As applicable, the following shall be provided for all new mechanical systems:

a. Air intakes. Air intakes to heating, ventilation, and air conditioning (HVAC) systems that are designed to move air throughout a building that are at ground level provide an opportunity for aggressors to easily place contaminants that could be drawn into the building.

1) New buildings. For all new buildings covered by this document locate all air intakes at least 10-ft above the ground.

b. Emergency air distribution shutoff. For all new buildings provide an emergency shutoff switch in the HVAC control system that can immediately shut down air distribution throughout the building. The switch (or switches) must be located to be easily accessible by building occupants. Providing such a capability will allow building occupants to limit the distribution of airborne contaminants that may be introduced into the building.

c. Utility distribution and installation. Utility systems can suffer significant damage when subjected to the shock of an explosion. Some of these utilities may be critical to safely evacuating personnel from the building or their destruction could cause damage that is disproportionate to other building damage resulting from an explosion. To minimize the possibility of the above hazards apply the following measures:

1) Utility routing. For all new buildings route critical or fragile utilities such that they are not on exterior walls.

2) Redundant utilities - Not Used.

d. Equipment bracing. Mount all overhead utilities and other fixtures to minimize the likelihood that they will fall and injure building occupants. Design all equipment mountings to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction. This standard does not preclude the need to design equipment mountings for forces required by other criteria such as seismic standards.

e. Under building access. To limit opportunities for aggressors placing explosives underneath buildings, ensure that access to crawl spaces, utility tunnels, and other means of under building access is controlled.

f. Mass notification. All buildings must have a timely means to notify occupants of threats and instruct them what to do in response to those threats.

1) New buildings. All new buildings must have a capability to provide real-time information to building occupants or personnel in the immediate vicinity of the building during emergency situations. The information relayed must be specific enough to discriminate appropriate response actions. Any system, procedure, or combination thereof that provides this capability will be acceptable under this standard.

8. Clearance Requirements:

a. Apparatus Room - Install as high as possible i.e.. including ductwork, HVU-1, piping, retractable air hose reels, etc.) minimum of 17.5 feet

b. Apparatus Room - Interior Fire Truck Fill Outlets shall be at 17.5 feet above floor.

c. Apparatus Room - Retractable air hose reels shall be accessible when standing on apparatus bays 170a-e floor avoid conflicts with hose bibbs.

1.2.4 Mechanical Equipment Rooms Layout Requirements

The mechanical equipment room layouts (including generator room layouts) shall be provided with ample floor space to accommodate routine maintenance of equipment and have head-room to accommodate required equipment. Ample space shall be provided around equipment to allow unobstructed access for entry, servicing, and routine maintenance. Space provided in rooms for service and/or replacement of filters, coils, motors, and other equipment items shall be indicated with broken (dashed) lines on the drawings. Provisions for installation, removal, and future replacement of equipment shall be coordinated with the architectural design. The as-built drawings shall be provided in accordance with Section 01040 AS-BUILT DRAWINGS. The arrangement, selection, and sizing of all mechanical equipment shall be such that it can be broken down and removed from the building without dismantling any adjacent systems or structures. A 60 percent design submittal shall be provided for approval to verify mechanical room layout. Fire-rated walls shall be as required in Section 01003 ARCHITECTURAL BUILDING REQUIREMENTS. Mechanical equipment shall be energy efficient per

Executive Order 12902, and ASHRAE/90.1. Servicing and maintenance areas interior and exterior to building shall be sized according to manufacturer's recommendations for equipment.

1.2.5 Mechanical/Electrical Equipment Coordination

Arrangement of all mechanical equipment and piping shall be coordinated with electrical work to prevent interference with electrical conduits that may run through the mechanical room(s) and to insure adequate space in shared chases. Mechanical equipment (pipes, ducts, etc. unless items solely serve the area) shall not be installed OVER OR WITHIN SPACE which is dedicated to transformers, panelboards, or other electrical equipment unless items solely serve the area. When electrical equipment is located in a mechanical equipment room, the dedicated electrical space shall be indicated by a dashed line and noted "Electrical Equipment Space".

1.2.6 General Mechanical Requirements

As applicable, the following shall be provided for all mechanical systems:

a. All piping and equipment located in finished areas of the building shall be concealed or furred-in; exposed piping and equipment is only allowed in utility, equipment, storage and other rooms of this nature.

b. Provide separate isolation valves, balancing valve, flow measuring device, and pressure/temperature test taps at all heating and/or cooling units, pumps, hot water unit heaters, triple duty valves shall not be allowed.

c. All coils shall be provided with valved drain and air vent connections.

d. Air vents shall be installed on all high points in piping systems. Drain valves shall be installed at low points and at equipment which must be dismantled for servicing.

e. Strainers shall be provided with a valved blowdown connection.

f. All vents, drain valves, and strainers which are located out of mechanical room spaces shall be provided with hose-end connections. All vents, drain valves, and strainers which are located within mechanical room spaces shall be piped to a floor drain.

g. Provide bypass piping with a balancing globe valve or cock around all non-redundant control and regulating valves. (Not applicable to Fan Coil Units.)

h. All butterfly valves shall have spool pieces upstream and downstream so that the disk can not enter any adjacent fitting.

i. Except at pump intake connections, eccentric reducers shall not be used.

j. Where steel flanges mate with cast-iron flanges, provide flat faces and full face gaskets.

k. Piping and supports shall not interfere with equipment maintenance access or pull space.

l. Dielectric unions shall be installed between dissimilar metals in soldered and threaded piping systems and insulated flanges shall be installed for welded systems.

m. All underground metallic lines, fittings, and valves; except for cast-iron piping, shall be cathodically protected in accordance with Electrical Section paragraph entitled "Cathodic Protection".

n. All exterior,underground non-metallic piping shall be buried with pipe detection tape.

o. Water and natural gas service lines shall be metered where they enter the building and buried with pipe detection tape and tracer wire.

p. All pumps, regardless of service, shall be non-overloading allowing the pump to operate at any point in its characteristic curve.

r. A thermometer shall be installed on the supply and return piping to/from each coil. Thermometers shall be legible to service mechanics standing at ground level.

s. Temperature/pressure taps shall be provided on the supply and return piping of each coil.

t. Pipe taps, suitable for use with temperature or pressure probe, shall be located at each pressure gauge.

1.2.7 Roof Mounted Equipment

Except for plumbing vents, exhaust fans, and louvered intake penthouses, no other mechanical equipment shall be located on the roof of the facility.

1.2.8 Vibration Isolation/Equipment Pads

Provide vibration isolation devices on all new floor mounted or suspended mechanical equipment. All new floor mounted mechanical equipment shall be provided with 6-inch thick housekeeping pads which extends 6-inches all around equipment provided.

1.2.9 Permanent Maintenance Instrumentation

Provide sufficient instrumentation to aid maintenance personnel in balancing and/or troubleshooting mechanical systems. Instrumentation shall be provided in the media at each change in temperature and at all mixing points in air handling systems, at all discharges of air handlers, and at all return mains. Pressure gauges, thermometers, flow indicators, sight glasses, etc., shall be installed to be easily read from the adjacent floor. Separate pressure gauges shall be installed on both the suction end and discharge end of pumps. Provide an isolation valve on all pressure gauges. Thermometers shall have separable socket thermo-wells. Allow for the removal, repair, or cleaning of flow measuring devices without having to shut down the system. Provide a portable meter, with appropriate range, for each type of flow measuring device installed.

1.2.10 Temporary Control Instrumentation

Instrumentation shall be provided for the field calibration of all control and monitoring devices, and for the commissioning of the mechanical systems. Provide local indication measuring instrumentation for each of

the HVAC control system components. Local instruments are to be independent of sensing devices used for the control system. The exceptions are air flow measuring stations, turbine flow meters, pitot tubes, and other flow measuring devices that may be shared as sensing devices by local indicating devices and control system devices and are required to be permanent. Local instruments are to be of industrial quality, must be certified as being factory calibrated, and must be capable of field calibration using standard procedures. Measuring provisions shall be provided at each varying input and control output in the system.

1.2.11 Color Coding Scheme for Locating Hidden Utility Components

To identify points of access for maintenance and operation of hidden utility components, a color coding scheme shall be provided for all areas of the facility where suspended grid ceilings are installed. Color coding scheme shall meet the requirements of Technical Specification 09900 PAINTS AND COATINGS.

1.2.12 Utility Interruptions

Certain limitations on utility interruptions apply. Unauthorized utility interruptions will not be permitted. Any work that requires a utility interruption shall be scheduled in advance. Outages are subject to postponement or cancellation by site authorities without prior notification. Coordination requirements of utility interruptions shall be in accordance with SECTION 00800 SPECIAL CONTRACT REQUIREMENTS. All utility interruptions shall be identified with notes on the project drawings.

1.2.13 Power Outage Start-Up

Upon an electrical power outage, all air handling units, pumps, and other major mechanical equipment will shut down and shall be restarted in a logical and efficient manner. Timing between starts and sequence of equipment starting upon restoration of electrical power shall be provided and programmed into the HVAC temperature control system, with programming capable of being changed by the operating personnel.

1.2.14 Spare Parts Lists

Proprietary spare parts lists that require more than a 60 day lead time, and/or any special service tools shall be provided to the Government at the Final Inspection.

1.2.15 Equipment Room Diagrams

The following "As-Built" information, permanently mounted in a frame and covered by clear plexiglass, shall be provided in the mechanical equipment rooms:

a. Air distribution diagrams and damper schedules.

b. Hot water piping diagrams and valve schedules.

c. Chilled water piping diagrams and valve schedules.

d. Control diagrams, control device schedules, and sequences of operation.

1.2.16 Interior Design - Color Coordination

All mechanical items located in finished areas and on exterior walls, shall be coordinated with and painted to match the color scheme requirements of Technical Specification 09915 COLOR SCHEDULE.

1.3 EQUIPMENT IDENTIFICATION AND ABBREVIATIONS

This Section contains requirements for the identification and abbreviation of mechanical equipment.

1.3.1 Equipment Identification

Provide a brass name tag for each valve, temperature control device, control system device, etc., installed in all mechanical systems. In addition, all mechanical equipment shall be clearly identified with a conspicuously located, permanent label. Mechanical equipment shall be identified by type and sequence number. For example, the air handling unit in the building shall be identified as AHU-1, the first hot water pump shall be HWP-1, the second hot water pump shall be HWP-2, etc..

1.3.2 Abbreviations

The following list of abbreviations shall be used to describe the HVAC equipment types:

Air Dryer . . . . . AD

Air Handling Unit . . . . . AHU

BoiLeR . . . . . BLR

Cabinet Unit Heater . . . . . CUH

Chilled Water Pump . . . . . CWP

Control Air Compressor . . . . . CAC

Control Valve CV

Domestic Water Heater . . . . . DWH

Exhaust Fan . . . . . EF

Expansion Tank . . . . . ET

Fan Coil Unit . . . . . FCU

Filter Bank . . . . . FB

FinTube Radiation . . . . . FTR

Gov't Furnished Contractor Installed. . GFCI

Gov't Furnished Gov't Installed . . . . GFGI

Heating Ventilating Unit . . . . . HVU

Hot Water Pump . . . . . HWP

Horizontal Unit Heater . . . . . HUH

Local Control Panel . . . . . LCP

Motor Operated Damper . . . . . MOD

Make-up Air Unit . . . . . MAU

Not In Contract . . . . . NIC

ReHeat Coil . . . . . RHC

Relief Hood . . . . . RH

Supply Fan . . . . . SF

Transfer Fan . . . . . TF

Vertical Unit Heater . . . . . VUH

1.4 IDENTIFICATION OF PIPING

All exposed and concealed piping in accessible spaces shall be identified with color coded bands and titles in accordance with the requirements of Technical Specification 09900 PAINTS AN COATINGS.

1.5 SEISMIC PROTECTION FOR MECHANICAL PIPING AND EQUIPMENT

This Section contains instructions and engineering requirements relating to the seismic protection design of mechanical piping, ductwork, and equipment. Structural bracing and mounting of mechanical equipment mounting and shall be designed in accordance with TI 809-04 and Technical Specification 13080 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT. The facility is to be considered Seismic Use Group III E, Design Category C, with site classifications indicated in Section 01005 STRUCTURAL REQUIREMENTS. The design of facility mechanical systems shall meet the seismic requirements of Technical Specification 15070 SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT.

1.5.1 Piping

Piping within the facility, including fire protection piping, is required to have seismic restraints. All water pipes for fire protection systems shall be designed under the provisions of the current issue of the "Standard for the Installation of Sprinkler Systems" of the National Fire Protection Association NFPA 13, see Section 01008 FIRE PROTECTION REQUIREMENTS.

1.5.2 Ductwork

Ductwork within the facility, is required to have seismic restraints.

1.5.3 Floor Mounted and Suspended Equipment

See Specification 13080 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENTfor requirements in securing floor mounted and suspended equipment within the facility.

1.5.4 Miscellaneous Equipment

Miscellaneous items which consist of a number of individual components built into an assembly by the manufacturers may require additional internal reinforcements to meet Specification 13080 SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT.

1.6 THERMAL INSULATION OF MECHANICAL SYSTEMS

Insulation requirements of new mechanical systems, including insulation of plumbing systems and equipment, hot water piping systems, chilled water piping systems and equipment, and the insulation of the duct systems shall meet the requirements of Technical Specification 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS. Heating piping in heated spaces and conditioned spaces shall be insulated. Hot water piping shall be required to follow tabulated thicknesses. Domestic hot and cold water piping shall be insulated. Cold piping shall have a vapor barrier. High abuse areas shall have aluminum jackets such as janitor's closets and mechanical rooms etc..

1.6.1 Insulation Covers

Provide reusable insulation covers at all check valves, control valves, strainers, filters, or any other piping component requiring access for routine maintenance. Insulation exposed to the weather or possible physical damage shall be covered by an aluminum metal jacket. All piping with metal jacket shall be identified on the drawings.

1.7 PLUMBING SYSTEM

This Section contains instructions and engineering requirements relating to the design of the plumbing systems as required. A plumbing system consists of the domestic hot and cold water supply distribution system to the various plumbing fixtures; make-up water piping to the various hydronic type environmental control systems (i.e. expansion tanks, boilers, etc.); fixtures, and fixture traps; make-up water to Food Service Equipment; soil, waste, and vent piping; and shall extend from connections within the structure to a point 5 feet outside the structure. The design of all plumbing systems shall, unless otherwise stated herein, comply with the most current International Plumbing Code and shall meet the requirements of Technical Specification 15400 PLUMBING, GENERAL PURPOSE. Traps for lavatories, and sinks shall be chromium-plated, adjustable-bent tube, 20-gauge brass, where exposed. All backflow preventers shall be installed for accessibility per Plumbing Code and shall comply with the requirements of the Department of Environmental Quality (DEQ) of the State of Colorado. State licensed plumbers shall install and/or test backflow preventors and cross connections devices. For Fire Protection backflow preventor requirements see Section 01008 FIRE PROTECTION REQUIREMENTS. Lead content in the water distribution system (including in-line devices) shall comply with SDWA of 1998 with amendments and ANSI/NSF 61, section 9. In-line devices shall include water meters, building valves, check valves, meter stops, valves and fittings and backflow preventors. A grease interceptor in the Kitchen sewer system shall be provided. Provide a separate line for sanitary line serving Toilets etc. from kitchen. Underground soil, waste

and drain may be cast iron piping. Soil piping does not require any cathodic protection.

1.7.1 Water Service Entrances

New water service entrance lines shall be installed below the recognized frost line and enter the building through the mechanical room floor. Water service entrances shall be provided with a positive displacement type water meter up to and including 2-inch and a turbine type water meter for greater than 2-inch, a pressure reducing valve and a reduced pressure principal backflow preventer with isolation valves located inside the building. Meters shall be provided with a direct non-resettable, digital. Meters shall have a pulse switch initiator capable pulse output of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments or 4-20 mA output. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. Meters shall be connected to Williams Electric Company Temperature controls and UCS system.

1.7.2 Piping Runs

Piping runs in buildings shall be arranged to not interfere with movement of personnel and equipment. Neither water nor drainage piping shall be located over electrical equipment or panels. Domestic water piping located outside of mechanical equipment areas shall be routed in the ceiling space above the corridors. Water and waste piping shall not be located in exterior walls or other spaces where there is possibility of freezing. Where piping is to be concealed in wall spaces or pipe chases, such spaces shall be checked to insure that clearances are adequate to properly accommodate the piping. Water piping shall be designed not to exceed a velocity of 8 fps at full flow.

1.7.3 Pipe Materials

Table I in Technical Specification 15400 PLUMBING, GENERAL PURPOSE identifies available material alternatives for above/below ground soil, waste, and vent. Materials for aboveground domestic hot and cold water distribution systems shall be copper. All copper piping 2-inch and smaller shall be soldered using 95/5 tin antimony solder, piping 2/1/2-inch and larger shall be brazed. Multi-flame torch is not required for soldering or brazing. The Tables shall be edited to indicate which materials shall be used for installation of each system.

1.7.4 Protection of Water Supplies

Cross connections between water supply piping and waste, drain, vent, or sewer piping are prohibited. Reduced pressure type backflow preventers shall be provided on all make-up water systems.

a. Lawn Irrigation

An automatic lawn sprinkler irrigation system shall be provided for the sodded lawn and landscaped areas of the Main Fire Station. Design requirements for the sprinkler irrigation system is defined in the Section \=1002=\ Site Work under paragraph entitled "Composite Utilities". A reduced pressure principal backflow preventor with isolation valves located in the mechanical room (reference paragraph MECHANICAL ROOM LAYOUT REQUIREMENTS) shall be provided in the supply line to each lawn irrigation system in order to protect the domestic water system in the building from

the lawn irrigation system. Piping within 5-feet of the building shall be in accordance with Guide Specification 15400 PLUMBING, GENERAL PURPOSE.

1.7.5 Fixtures

Plumbing fixtures (water closets, urinals, lavatories, kitchen sinks, kitchette unit sink, etc.) shall conform to ASME standards, the requirements of Technical Specification 15400 PLUMBING, GENERAL PURPOSE and Executive Order 12902 with; lead-free faucets. End-point devices shall meet lead leaching requirements of ANSI/NSF 61, section 9, i.e.. (lavatory faucets, kitchen and bar faucets, residential ice makers, supply stops and end point control valves). In-line devices do not have to meet section 9 (i.e.. bath and shower valves, all drains, backflow preventors). Work shall consist of but not be limited to the following. Coordinate location with the architectural plans (see also paragraph FOOD SERVICE EQUIPMENT).

a. For washer and dryer hookups see paragraph WASHER CONNECTIONS and LAUNDRY ROOM EXHAUST.

b. Provide electric water cooler located in corridor near Men's Sinks/Toilet, in corridor near Communications room and dual service in corridor near handicapped toilets.

c. Provide floor-mounted corner type Janitor's closet sink in Janitor's closets.

d. Waterless urinals shall not be allowed; maintenance is required to the trap once every 6 months.

e. Water conservation fixtures (low flow type) with automatic metering devices conforming to the Technical Specification 15400 shall be provided in all toilets. Automatic operating hard-wired electronic sensor flush valves shall be provided for urinals in the Men's Toilet. Automatic operating hard-wired electronic sensor water closets and faucets shall also, be provided in the Men's & Women's Sinks/Toilets & Handicapped Toilets. Battery-operated sensors shall not be allowed. Hard-wired electronic sensors shall be provided with emergency pushbutton for maintenance.

f. Provide showers in Toilet room 116, Women's Shower 149 and Men's Shower/Locker Room 152.

g. Laundry Room: Provide Laundry sink 24x24x10 inches in the Laundry room next to two GFGI heavy-duty front loading washers and two GFGI front loading dryers. The laundry is for cleaning physical training and duty uniform clothes only.

h. Fire Gear Cleaning room provides cleaning of protective clothing. A double compartment utility sink shall be provided with gooseneck faucet. Low pressure compressed air shall also, be provided. See WASHER-EXTRACTOR paragraph below and paragraph WASHER-EXTRACTOR CONNECTIONS.

i. Dispatch/911 Center 107 is to have a "Dwyer Products Company" kitchenette unit with a two electric burner type range, single sink and single refrigerator.

1. Washer-Extractor (for fire gear)

a. Provide one washer-extractor for fire gear cleaning room. Unit shall have the following dimensions wide x deep x height (34.5 in. wide x 44.3 in deep x 53.8 in height). Unit shall have 30 different programmable wash formulas, including 10 pre-programmed strictly for decontaminating fire fighters gear. Units shall be 35 lb. capacity. Power requirements 208/60/3 phase, with FRN10 fuses in a separate disconnect. Shall be provided with a 6-inch concrete base. Pre-programmed wash formulas shall include the following:

1) Light soil turnouts
2) Heavy soil turnouts gloves
3) Moisture barriers
4) Breathable vapor barriers
5) Oil-contaminated gear
6) Brush gear
7) Hoods/suspenders
8) Truck towels
9) Stationwear
10) Sheets/pillowcases

i. Break room Sink.

Provide single bowl stainless steel bar sink with gooseneck faucet in the break room.

j. Water Supply for Coffee Maker (Break room)

Provide a 3/8-inch domestic cold water supply line for coffee maker use. The line shall be stubbed out approximately 2-inch.

k. Provide two utility sinks in the Apparatus Room 175.

l. Garbage Disposal

Garbage disposal shall be provided in sink in double sink in kitchen and shall conform to commercial standards, continuous feed, minimum 1/2 hp heavy duty motor, corrosion resistant grinding elements, two 360-degree stainless steel anti-jam swivel impellers, manual motor reset, and sound insulation. A plug connector may be required.

m. Ice Machine (Kitchen) & Apparatus bays Water Supply

Provide a 3/8-inch domestic cold water supply line for ice machine use. The line shall be stubbed out approximately 2-inches from the wall and shall be provided with a shut-off valve. Also, provide activated carbon filter in the makeup water line and a sediment filter.

n. Water Supply for Coffee Maker (Kitchen)

Provide a 3/8-inch domestic cold water supply line for coffee maker use. The line shall be stubbed out approximately 2-inches from the wall and shall be provided with a shut-off valve.

o. Provide a domestic cold water supply line for the humidifiers use in the mechanical room including shut-off valves for both.

p. Provide a water softener for the water service to the building.

q. Provide High pressure washers with soap/water next to every other apparatus room 175 shop air exterior columns for a total of six.

1) HIGH PRESSURE COLD WATER WASHER

a) Rough-in

Provide high pressure, cold water washer system producing 1000 psi pressure at 4 gpm flow rate. Provide hot and cold water mixing valve to allow entering water temperature to be adjustable from full cold water flow to full hot water flow, not to exceed 160 degrees F.

b) Pump

Belt driven, horizontally laterally aligned triplex plunger pump with oil bath crank case, forged bronzehead, polished ceramic plungers, stainless steel valves, Buna N seals, one piece connecting rods, forged steel wrist pins, forged steel crankshaft and heavy duty crankshaft bearings.

c) Motor

Totally enclosed forward curved 1750 rpm, 1.15 service factor, ball bearings, class B insulation, UL listed.

d) Water System

Non back siphoning, elevated flooded suction stainless steel float tank. Provide float valve, sediment bowl strainer, 240 degree F thermometer, 167 degree thermal relief valve in suction line. Provide pressure gauge, unloader valve and pulsation dampener in discharge line. Provide automatic bypass timer to shut down that water pump when in bypass mode for longer than three minutes.

e) Detergent System

Provide downstream detergent injector mounted on the unit. Detergent system will be controlled at the wand with a double barrel lance with pressure adjusting handle.

f) Wand and Nozzles

Pistol grip trigger shut off gun with 36 inch double barrel lance with side handle pressure adjusting handle and pressure wash tips of 0, 15, and 25 degree spray angles.

g) Pipe and Fittings

Piping to pressure washer system shall be schedule 40

r. (Break room) Water Supply refrigerator ice maker

Provide a separate 3/8-inch domestic cold water supply line for the refrigerator ice maker. The line shall be stubbed out approximately 2-inches from the wall and shall be provided with a

shut-off valve. Also, provide activated carbon filter in the makeup water line and a sediment filter.

1.7.6 Janitor's Closet Sinks

A enameled cast iron floor mounted type service sink shall be provided in janitor's closets. Overall sink dimensions shall be approximately 28 x 28 inches. The depth of the floor sink bowl shall be approximately 10-inch.

1.7.7 Electric Water Coolers

Bi-level, accessible or barrier-free, mechanically refrigerated electric water coolers shall be provided (as indicated on Architectural plans), with part of each suitable for use by the physically handicapped where indicated. Bottom spout unit shall be 27-inches above finished floor. Spout shall be 34-inches above finished floor. The push bar shall be front or front and side mounted. Cooler shall be lead-free and use CFC-free refrigerant R-134a. Unit shall provide a minimum of 8 gph at 50 °F. Coolers shall be certified to meet ANSI/NSF 61, Section 9 and meet lead leaching requirements of section 9.

1.7.8 Water Hammer Arresters

Commercially available water hammer arresters shall be provided at all new quick closing valves such as flush valves and solenoid valves and shall be installed according to manufacturers recommendations. Vertical capped pipe columns are not permitted in lieu of water hammer arrestors.

1.7.9 Disinfection EMS/Decon Room

Emergency operations shall require a disinfecting room for cleaning of emergency medical equipment. Room shall meet cleanliness requirements of NFPA 1581. Disinfection EMS/Decon room and medical storage shall comply with all technical requirements of NFPA standards and paragraph 3-8 of NFPA 1581. Disinfection EMS/Decon room shall be provided with a triple-container sink with faucets, and a separate wall faucet, shower, and stainless steel grate, and backsplash.

a. Three-Compartment Sink

Sink shall conform to the applicable requirements of the National Sanitation foundation (NSF) International Standard; Food Service Equipment Listing. Sinks shall be constructed of a minimum 14-gauge stainless steel. Sinks shall be equipped with waste and overflow fitting, drain plug with quick opening valve, and faucets. The sinks shall have approximately 24x 24x 24 inch compartments.

1) Faucets.

Faucets shall be provided for all three compartments. Fittings shall have swinging spout, approximately 8-inch length, with foot-operated operation. Including grating/backsplash/sprayer all stainless steel.

1.7.10 Laundry Room & Fire Gear Cleaning room & Apparatus room 175 Utility Sinks/Faucets

A utility sink shall be provided in the laundry room, fire gear cleaning room with dual basin & two in apparatus room 175. The sink shall be wall

mounted, white enameled cast iron. The overall sink dimensions shall be approximately 27 x 23 inches. The sink shall have an extra deep bowl; minimum of 13-inch.

1.7.11 Wall Hydrants

Exterior freeze-proof wall hydrants with vacuum-breaker-backflow-preventer shall be located on exterior outside walls at 200 feet intervals of the facility for exterior garden hose use. A wall hydrant shall be provided near Mechanical Room exterior door. Exterior wall hydrants shall be mounted 2-feet above finished grade.

1.7.12 Wall Faucets

An interior wall faucet shall be provided in Mechanical Equipment Rooms. Wall faucets shall be mounted 36-inches above the finished floor. As a minimum one standard hot and cold water garden hose bibb shall be provided for every other column in the vehicle bays in the apparatus room 175 for a total of two on each side of the apparatus room 175. One wall cold water faucet shall be provided in the disinfection EMS/decon room .

1.7.13 Not Used

1.7.14 Emergency Shower/Eye washes

Emergency Shower/Eyewash shall be provided (2) in the apparatus room 175 and hazmat storage. Each eyewash and combination shower/eyewash shall be equipped with a mixing valve station located next to unit. All units shall be connected to the building plumbing system.

a. Mixing Valve Stations

1) Station shall be constructed to thermostatically control the mixing of hot and cold water and to deliver tempered water at a desired temperature regardless of pressure or input temperature changes. Station shall be a thermo-mechanical system with thermally activated and pressure-activated safety features that do not require electricity for operation. Outlet temperature shall be adjustable 59 to 84.2 degrees °F and shall be initially set at 69.8 °F. Station shall be equipped with 1-1/4-inch inlet and outlet manifold piping with associated isolation valves, unions, strainers on inlets, checkstops, vacuum breaker, outlet temperature gauge, bypass valve, mixing valve, temperature adjustment knob, etc..

2) Safety features shall include: a) a pressure relief cold water bypass of the main mixing valve that protects against constricted flow of either hot or cold water; b) scald protection including a high temperature limit control valve (set @ 84.2 °F non-adjustable that modulates incoming hot water; and c) the high temperature valve opens to provide tempered water when there is a unregulated flow of cold water (pressure relief valve is operating).

3) Cabinets for mixing valves shall be constructed of a size to accommodate the equipment to be factory installed therein, shall be rigidly assembled with joints welded, and shall be punched or drilled for the top passage of required pipes. Cabinets shall be fiberglass or 16 gauge minimum sheet metal. Sheet metal cabinets shall be primed and factory finished with baked on enamel. Cabinets shall include a lockable flush-fitting hinged front door with a viewing window. The station

isolation valves required can be installed outside the cabinet if they are tamper resistant type.

1.7.15 Service Stop Isolation Valves

For normal maintenance or replacement, servicing stop isolation valves shall be installed in water connections to all installed equipment and fixtures. In addition, stop valves shall be provided to isolate portions of systems so as to not require shutdown of entire systems. Stop isolation valves for piping and equipment shall be shown on the drawings. Service stop isolation valves to faucets shall meet ANSI/NSF 61, section 9 lead leaching requirements.

1.7.16 Floor Drains

A floor drain shall be provided in mechanical equipment rooms, toilet rooms/lockers' shower drying areas including rooms, handicapped toilets, men's toilet, men's sinks' room, women's toilet, laundry room, kitchen, fire gear cleaning room, two in disinfection EMS/decon room , fire extinguisher maintenance room, emergency shower/eyewash and one in each janitor's closets.

a. To prevent traps from drying out, deep seal traps or automatic trap primers shall be provided on all floor drains.

b. The mechanical equipment rooms shall be provided with sufficient floor drains to accommodate routine maintenance and drain down of equipment and piping within the room without running drain pipes over the floor. In addition, a floor drain shall be provided in kitchen, near humidifiers, dishwasher(s) & ice machine areas, kitchen. Floor drains in the Kitchen may be of the floor sink or trench drain type. A floor sink may be provided for each indirect waste plus floor drains. Multiple indirect wastes can be routed to a single kitchen floor sink or even a hub drain where the local code allows.

1.7.17 Kitchen Grease Interceptor

Construction of trap, interceptor minimum size (interior or exterior) installation shall conform to local code requirements. Unit shall meet the requirements of specification section 15400, installed flush with the floor. Minimum capacities shall be 75 gpm, 150 pounds grease, 105 gallon holding volume and 4-inch threaded outlet unless otherwise required by local codes. Size shall depend on volume of fixtures, capacity in gallons and drainage period of 1 minute.

1.7.18 Cleanouts

On straight runs of pipe,cleanouts shall be provided at not more than 50 feet apart. Cleanouts shall be provided at each change of direction of pipe and shall be provided at the base of all storm, soil, waste, and vent stacks.

1.7.19 Plumbing Vents

Where feasible, combine circuit vents in a concealed space to a main vent through the roof in lieu of an excessive number of individual vents through the roof. All vent lines through roof shall be 4-inch and terminate a minimum of 6-inch above finished roof. Where vents connect to horizontal soil or waste lines, the vent shall be taken off so that the invert of the

vent pipe is at or above the centerline of the horizontal soil or waste pipe.

1.7.20 Duct Drainage

Outside air intake stormproof louvers and louvered penthouses shall be ducted and shall have provisions to dispose of melted snow and wind-blown rain which enters through the stormproof louvers. The duct seams shall be sealed watertight (soldering or brazing is not required) and a drain provided at the duct low point. The drain shall be routed to a floor drain. Duct access doors shall be provided near the louvers. Motorized dampers shall be provided at the exterior of the building.

1.7.21 Domestic Hot-Water Boilers

Domestic water heaters (Boilers)140 °F shall be located in the mechanical room and shall be low NOx of 30 ppm or less. Water heater capacities shall be equal to the maximum demand of all fixtures operating. Heaters shall be gas fired with a combined water storage tank. The capacity of the water heaters shall be adequate to meet the peak hot water requirements of the facility and shall be designed in accordance with Chapter 48, Service Water Heating, of the 1999 ASHRAE HVAC Applications Manual. An inlet water temperature of 39.2 °F shall be used for sizing the water heater. Minimum efficiency shall be determined by the low NOx gas-fire boiler requirements. Water storage temperature shall be approximately 140 °F. Provide 110 °F water at lavatory faucets by using mixing valve(s). Hot water for dishwasher purposes shall be provided by a built-in booster heater in the dishwasher located in the Kitchen.

a. Micro-processor based energy savings device (controller)shall be provided for each hot water heater (boiler) to time the last off-cycle and compute percentage of that period (the economy factor) and then delay ignition of the burner by that calculated additional time. By constantly applying this percentage, the amount of delay varies according to the last off-cycle. Longer off-cycles mean less demand and the micro-processor calculates longer delays. Shorter off-cycles mean greater demand and controller calculates shorter delays. Should the temperature of the water drop to a programmable low limit, due to a sudden increase in demand, the micro-processor immediately cancels any extended off-cycle, allowing the burner to ignite. Controller is wired in series between the operating control and the burner controls. During a power failure, a magnetic relay closes, returning the system to its preinstalled condition. The micro-processor shuts its self-down in the event of a power failure and returns to the last programmed setting when correct power is restored.

b. Domestic Water Heater Vents

Domestic water heater vents shall be type "B", and shall conform to UL 441. Boiler stacks and domestic hot water heater vents shall not be tied together. Height of vents shall be as required by NFPA 54 and shall be provided with a rain cap. Also, see paragraph Vents and Stacks.

c. Contractor alternative design - Active solar water preheating of domestic hot water shall be considered. A Feasibility Study (SOLFEAS) or LIFE CYCLE COST ANALYSIS (LCCA) is not required. However, a SOFEAS analysis is required to determine the collector sizing and array. Active solar water preheating shall be an indirect (closed-loop) water heating system with 30% propylene glycol and drain back system per ASHRAE 1999 HVAC APPLICATIONS, Chapter 32 and section 13600A SOLAR SYSTEM EQUIPMENT.

Direct water heating systems, thermosiphon water heating systems, and drain down water heating systems shall not be used. System shall be provided with two pumps, a heat exchanger, and an expansion tank. Provide the following on the drawings:

1) Solar Collector Array:

a. SOLFEAS result for minimum array size.
b. Total array size to be installed.
c. Bank size ie. 4 foot (4, 5, 6, or 7 collectors) and number of banks.
d. Minimum row spacing in event of multiple rows of collection.
e. Array orientation with respect to true south.
f. Reverse-return strategy is important to proper array operation.
g. Pipe pitch for draining.
h. Flow rate through collector loop based on recommended flow per collector.

2) Solar Collector Construction (flat plate, liquid, internally manifolded type):

a. Number of collectors.
b. Gross area and net aperture area.
c. Collector height and width.
d. Collector fluid volume.
e. Collector filled weight.
f. Collector manufacturer's warranty period.
g. Recommended collector flow rate.
h. Pressure drop across the collector at recommended flow rate.

3) Supports for Solar Collector Array:

a. For the majority of solar projects, this structure will be constructed as a support rack on a flat roof.

4) Storage Tank:

a. Storage tank volume should be between 1.5 to 2 gallons per square foot of collector area.
b. Identify minimum R-value of tank insulation.
c. Identify type of lining in tank.

5) Heat Exchanger:

a. Type of heat exchanger shell-and-tube or multiplate or plate-and-frame heat exchangers are allowed with an effectiveness of greater than 0.5.
b. Identify flow rates on both sides of heat exchanger. Flow rate on the storage side of the heat exchanger should be 1.25 times that on the collector side.
c. Identify plate or tube heat transfer area.

6) Expansion Tank:

a. This expansion tank sizing requires the expansion tank be able to accept an amount of fluid equal to the fluid volume of the collectors plus piping at the same height or above the collectors. This is in contrast to the conventional method of sizing the expansion tank to account for thermal expansion of the heat transfer fluid.

7) Heat Transfer Fluid:

a. USP/food-grade uninhibited propylene-glycol is a nontoxic, noncorrosive fluid used by the food industry. Use with distilled water solution.

8) Overall System Operations:

a. Contractor shall demonstrate that the solar energy system will operate properly while unattended for a period of at least 72 hours.

1.7.21.1 Domestic Hot Water Recirculation System

Domestic hot water recirculating pumps shall be provided for each water heater. Pump sizing shall be in accordance with simplified pump sizing method 1995 ASHRAE Applications Manual unless specific conditions warrant the need for more detailed calculations. The system shall continually circulate domestic hot water in order to insure that domestic hot water is available at each fixture without delay. The domestic hot water recirculating pumps shall be all bronze for long life. A clock, DDC or other automatic control shall be installed on domestic hot water circulation pumps to permit operation only during periods of occupancy plus 30 minutes prior. Initial operation shall be 24 hours per day.

1.7.22 Not Used

1.7.23 Cathodic Protection

Cathodic protection shall be provided for any new underground metallic piping, fittings, and valves except cast iron. Design of cathodic protection system shall in accordance with Section 01007 ELECTRICAL REQUIREMENTS, paragraph entitled "Cathodic Protection".

1.7.24 Compressed Air System

This section contains guidance for designing compressed air systems including piping and compressors. Where special conditions and problems are not covered, industry standards shall be followed. Compressed air systems shall be designed in accordance with ASME B19.1 and B19.3 Safety Standards for Compressor Systems and Technical Specification 15400. Compressed air piping shall be black steel. Minimum shop air compressor capacity shall be at least 40 scfm @ 125 psi. The compressor shall be located in the Dry/Chemical Fire Extinguisher Maintenance room, Fire Gear Cleaning room, and Breathing apparatus bays 170a-e.

a. Compressed air outlets shall be provided for servicing vehicle tires, brakes and operating air tools. Outlets shall be provided between each set of two bays on retractable hose reels mounted from roof joists for a total of two locations on both sides of the apparatus bays 170a-e. Retractable air hose reels shall be accessible when standing on the apparatus bays 170a-e floor. A total of four hose reels shall be provided in apparatus bays 170a-e.

b. Compressor Selection.

Compressor and all accessories shall conform to American society of Mechanical Engineers (ASME) B19.1 and B19.3, ASME Boiler and Pressure Vessel Code Section VIII, PTC-9 & PTC-10, and Instrument Society of American (ISA) S7.3, as applicable. Where lubricating oils cannot be tolerated at the point of use, oil-free operation is required in a non oil-free compressed air system, i.e. coalescing filters shall be used to

remove solids, moisture, and oil from the air stream in lieu of providing an oil-free compressor.

c. Analysis.

An analysis shall be made for each compressor selection to insure that the best value is obtained. Comparisons of such items including, but not limited to, brake horsepower (bhp) x per x scfm , unloaded horsepower, expected compressor life, and expected operation and maintenance costs, should be made between the different types of compressors before final selection is made. The analysis shall be included in the design analysis.

d. Compressor Capacity.

Total air requirements will not be based upon the total of individual maximum requirements, but upon the sum of the average air consumption of air operated devices. Determination of the average air consumption is based on the concept of load factor (the ratio of actual air consumption to the maximum continuous full-loaded air consumption). The Compressed Air and Gas Institute (GAGI) Compressed Air and Gas Handbook explains making the calculation, add 10 percent to the estimated consumption for leakage. The total is the compressor capacity required for design.

e. Compressor Location.

Adequate aisle space shall be provided between items of equipment for normal maintenance as well as for equipment removal and replacement per manufacturer's recommendations.

f. Foundations.

Foundations which are isolated from the building structure shall be provided for low pressure compressor. Six inch concrete housekeeping pad shall also be provided.

g. Make-up Air.

Compressor located in wet fire extinguisher maintenance room, shall be provided with a wall opening for make-up air. Exterior wall opening shall be provided with louver and motorized damper, damper shall open when air compressor starts and vice versa.

h. Piping

Compressed air piping shall be schedule 40, black steel.

i. Underground Piping

Underground compressed air piping shall not be permitted.

j. Pipe Sizing.

Compressed air piping shall be sized in accordance with Industry Standard.

k. Compressed Air (CA) Outlets.

A ball valve, pressure reducing valve (one for 125 psig), coalescing filter, and a quick-disconnect shall be provided at each compressed air outlet. Type of compressed air quick-disconnect shall be coordinated with

the air-devices used by the end User. Air outlets shall be located 36-inch above finished floor.

l. Retractable overhead air hose reels in Apparatus bays 170a-e

A ball valve, pressure reducing valves (one for 125 psig, coalescing filter, retractable overhead air hose reel, which shall be accessible when standing on the apparatus room 175 floor and a quick-disconnect shall be provided. Type of compressed air quick-disconnect shall be coordinated with the air-devices used by the end User. Two retractable overhead air hose reels shall be provided on each side of apparatus bays mounted on the roof joists. Retractable air hose reels shall be accessible when standing on apparatus bays 170a-e floor. Total of four retractable overhead air hose reels shall be provided.

m. Refrigerated Air Dryer.

A refrigerated dryer shall be provided, sized to match the compressor. A floor drain shall be located next to the dryer. Refrigeration equipment provided shall have an ozone depletion factor of 0.05 or less. HCFC-22 shall not be allowed. HCFC-22 alternatives shall be documented in the design analysis and catalog cuts provided for three manufacturer's before an alternate refrigerant's equipment will be allowed.

1.7.25 Washer Connections

a. Automatic Clothes Washer Connections - Drainage and hot and cold water supply shall be provided for the two GFGI automatic clothes washers. Washer connection, complete with 2-inch drain, 3/4-inch hose thread supplies, and electrical outlets for both washer and dryer, shall be provided in a standard manufactured recessed wall box with single-face plate. Box shall be constructed of sheet steel and shall have a corrosion-resistant epoxy enamel finish. Boxes shall be mounted 3 feet above the finished floor. Finish color shall be painted to match adjacent finishes.

b. Washer-Extractor connections

Provide 1/2 inches water supply (hot and cold) for Washer/Extractor. Provide 3-inch drain in back which shall drain into trough 12x12x36 inches. Also, provide 1/4 inch low pressure compressed air outlet & connection.

1.7.26 Government-Furnished Contractor-Installed (GFCI) SCBA Compressor System

a. The existing mobile SCBA compressor, cascade & controls, (4) 6000 psi high pressure cylinders, mask cabinet, tool box, PC, monitor and printer, fill station, 30 SCBA units along with 75 air bottles and storage racks shall be relocated from the existing Fire Station Building. This is to be done after the new fire station has been completed and with two weeks notice to the Contracting Officer and shall be relocated and installed by the Contractor in 72 hours. Relocate existing SCBA system to breathing apparatus room 175. Reinstalled GFCI SCBA system shall meet the requirements of NFPA 1404.

b. The SCBA system provides approximately 15.7 cfm at 6000 psig.

c. New intake air piping for the relocated SCBA air compressor shall be provided. It shall be routed through the roof, then down to the existing

SCBA high pressure compressor using a 3-inch PVC pipe fresh air inlet either from roof line or high on the exterior wall. Then it shall be connected to the relocated SCBA compressor by a 1- 1/4-inch flexible hose approved by the manufacturer. Intake air pipe shall penetrate the roof, extend 3' feet above the roof and be provided with a 90 degree elbow down which shall be covered with birdscreen. Intake air for the relocated SCBA air compressor must be located 49 feet from each of the following:

1) Any contaminated air source
2) Vehicular exhaust fumes
3) Emergency generator exhaust
4) Restroom and kitchen exhaust
5) Mechanical exhaust.

d. GFCI Compressor Location.

Adequate aisle space shall be provided between items of equipment for normal maintenance as well as for equipment removal and replacement per manufacturer's recommendations.

e. Foundations.

New foundations are not required.

f. Make-up Air.

Relocated GFCI SCBA compressor shall be located in Breathing apparatus room: a roof opening shall be provided for make-up air. Exterior roof opening shall be provided with raincap. Use 6-inch PVC for ducted outside air with accessible drain valve (& bushing) at bottom and provide vertical supports per section 15400. Provide a PVC tee (& bushing) for connection to the compressor intake filter assembly. Connection to Compressor shall be by (approx. 6' of vacuum hose) 1-1/4 inch flexible hose (& adapter). The connection to the tee must be lower than the compressor intake to prevent accumulated condensed water from passing to the compressor. A floor drain shall be located next to the drain valve.

g. Piping

New high pressure compressed air piping shall be stainless steel tubing rated for 6000 psig.

h. Underground Piping

Underground high pressure compressed air piping shall not be permitted to outlets.

i. Pipe Sizing.

New high pressure compressed air tubing shall be sized in accordance with Industry Standard.

j. Breathing Air (BA) Outlets.

A ball valve, pressure regulator and a quick-disconnect shall be provided at each breathing air outlet. The type of compressed air quick-disconnect shall be coordinated with the air-devices used by the end User. Two outlets shall be provided between GFCI SCBA high pressure compressor; one

on relocated workbench in SCBA Maintenance room and one in apparatus room 175, 36 inches above finished floor.

1.7.27 Interior Fire Truck Fill Outlets

Provide ten total fire truck fill stations on the interior of each apparatus bay of apparatus bays 170a-e located at the centerline above the fire trucks, i.e. when parked in each bay. Only one shall operate at a time. Each fire truck fill outlet shall be provided with 2 1/2-inch NSN thread (with ball valve) and shall be freezeproof. The main shall be a 3-inch common manifold for all outlets. Minimum operating pressure for each fire truck fill outlet shall be 20 psi. Minimum operating flow rate shall be 200 gallon per minute. These outlets shall be connected to the domestic water service. Outlets shall be 17.5 feet above the finished floor.

1.7.28 Exterior Fire Truck Fill Outlets ("Standpipes")

Provide four "standpipes" on the interior of the apparatus bays 170a-e for exterior use by firefighting personnel filling vehicles. Two "standpipes" shall be located on the interior of the apparatus bays 170a-e south side and two interior of the apparatus bays 170a-e north side. Two fill outlets shall operate at a time. Standpipes shall be evenly spaced from each other along the interior of the apparatus bays 170a-e and next to the exterior wall as indicated on sheet. Each standpipe shall be provided with 2 1/2-inch NSN thread, single fire department connection and shall be freezeproof. Each standpipe shall be independently operated and the tool used to operate these hydrants shall be able to operate without any obstructions. Minimum operating pressure for each standpipe shall be 20 psi. Minimum flow rate for each hydrant shall be 200 gallons per minute. These standpipe shall be connected to the domestic water service.

1.8 EXTERIOR GAS DISTRIBUTION SYSTEMS

This Section contains instructions and engineering requirements relating to the design of the exterior natural gas distribution system where required, including the building gas service lines and gas service regulator assemblies. The gas distribution systems shall be designed in accordance with NFPA-54, and shall meet the requirements of Technical Specification 02556 GAS DISTRIBUTION as attached.

1.8.1 Service & Main Lines

a. A new service line shall be provided and connected to the existing 6 inch 50 psi main line that is located east of the facility and shown on concept drawing U1.01. Pressure shall be reduced at the main regulator serving each building from 50 psig to 25 psig. The pressure serving each building shall be a minimum of 20 psig regulated down to building pressure required. The distribution system for the gas line will be all plastic as indicated. A gas pressure regulation station shall be provide where indicated and 4 bollards around it. The gas line shall be provided with an isolation valve. The tap into the existing main line shall be a "hot tap" and the Base Fire Department shall be given 30 days advance notification of the date of the tap (see minimum service line sizing paragraph Service Line Sizing). The point of connection shall be provided with a shutoff plug valve, conveniently located outside of any traffic area and protected with a valve box. Thirty days notice shall be given the Contracting Officer when the gas tie-in is to be made.

b. Provide underground line for barbecue grill for grill location). Provide isolation valve and threaded coupling.

c. Service lines shall not be installed under or routed thru the facility. Except for piping located at the new gas meter/service regulator assemblies, no aboveground gas piping shall be exposed to view. The service line shall enter the buildings in an accessible location outside the mechanical room areas and aboveground. The aboveground gas meter/service regulator assemblies shall be hidden from view to the greatest extent possible.

d. Service lines to buildings shall run parallel and/or perpendicular to the building lines, shall be buried at least 18 inches below the ground surface, shall not be laid in the same trench with other utilities, and shall be above other utilities whenever they cross. Main lines to buildings shall run parallel and/or perpendicular to the building lines, shall be buried at least 24 inches below the ground surface, shall not be laid in the same trench with other utilities, and shall be above other utilities whenever they cross. New gas lines shall not be laid under paved streets, parking lots, roads or in other locations subject to heavy traffic whenever practicably avoidable and economically feasible to locate elsewhere. Whenever it is necessary to locate gas lines in such locations, the lines shall be protected by suitable encasement or by burying to a depth to provide at least 5 feet of cover over the top of the pipe except gas lines shall be provided with encasement when laid under new or existing paved streets, and parking lots.

e. All manholes, or valve boxes of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas shall be adjusted to the new finish grade. Where manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, the existing frames and cover shall be removed and replaced with a heavy-duty frame and cover. The structure shall be adjusted as needed to fit the new conditions. All structures shall be of a type suitable for the intended use and shall conform to the requirements of the applicable section of these specifications

1.8.2 Service Line Sizing

The size of the service lines to new Facility and gas barbecue grill shall be sufficient to supply the demand without excessive pressure drop and shall not be less than 1-inch in size.

1.8.3 Service & Main Line Materials

All new underground service lines shall be polyethylene and all aboveground lines steel.

1.8.4 Service & Main Line Markers and Tracer wire

New underground service lines shall be identified by a permanent on grade utilities marker which indicates the type of service and depth of burial. Markers shall be located a maximum of 100 feet apart on straight runs and at every change in direction. Markers in high traffic areas shall be protected from physical damage. Markers shall consist of a stamped or engraved brass name plate embedded in concrete. Tracer wire shall be 18 gauge AWWG copper secured to piping at not more than 3 foot intervals.

1.8.5 Service & Main Line Protection

New below grade lines shall be protected from physical damage by placing a continuous, detectable plastic ribbon in the trench such that any excavation will uncover the ribbon prior to reaching the line. When non-ferrous service lines are in stalled, a foil backed magnetic tape shall be installed above the pipe to permit locating with a metal detector.

1.8.6 Cathodic Protection

Cathodic protection shall be provided for all underground metallic piping and fittings except cast iron soil piping. Design of cathodic protection system shall in accordance with Section 01007 ELECTRICAL REQUIREMENTS, paragraph entitled "Cathodic Protection".

1.8.7 Building Gas Meters

A gas meter shall be provided as part of the service regulator assemblies. Meters shall be provided with a direct non-resettable, digital readout. Meters shall have a pulse switch initiator capable pulse output of operating up to speeds of 500 pulses per minute with no false pulses and shall require no field adjustments or 4-20 mA output. Initiators shall provide the maximum number of pulses up to 500 per minute that is obtainable from the manufacturer. Meters shall be connected to existing EMCS Williams Electric Company temperature controls and UCS system.

1.8.8 Gas Barbecue Grill

Provide 36-inch Built-In Grill with Rotis, integrated side burner (no insulted jackets). Overall dimensions 36x 24 inches. Exterior finish shall be manufacturer's standard. Grill to be AGA design certified. Single 3/4 inch gas connection with manual shut-off valve and gas regulator shall be provided.

1.9 INTERIOR GAS PIPING SYSTEMS

This Section contains instructions and engineering requirements relating to the design of new interior natural gas piping systems. Interior gas piping systems shall extend from the outlet of the gas service regulator/meter assembly to the point of connection of each gas utilization device. The aboveground gas piping system shall be steel designed in accordance with NFPA 54 and shall meet the requirements of Technical Specification 15190 GAS PIPING. All interior gas piping shall be painted with one coat of primer and two coats of black paint.

1.9.1 Gas Piping

Piping shall be sized in accordance with NFPA 54 to supply the demand without excessive pressure drop between the point of delivery and the gas utilization equipment. Minimum interior gas pipe size shall be 3/4 inches. The calorific value of the natural gas to be used in calculations for sizing equipment and piping is 805. Gas piping shall be shown on the mechanical HVAC Drawings.

1.9.2 Equipment Connections

The final connection to gas equipment shall be made with rigid metallic pipe and fittings. Accessible gas shutoff valve and coupling are required

for each piece of gas equipment. Flexible connectors must be used for kitchen range and shall be at least 40 inches long. Other acceptable uses of flexible connectors include equipment located where accessibility shall be limited to qualified personnel. Flexible connectors must conform with ANSI Z21.45 except flexible connectors for movable food service equipment must conform to ANSI Z21.69. In addition to cautions listed in instructions required by the ANSI standards, flexible connectors will not be allowed to pass through equipment cabinets. Accessible gas shutoff valve and coupling are required for each piece of gas equipment.

1.10 NOT USED

1.11 HYDRONIC HEATING SYSTEMS

Heating system shall be a forced-air/hot water system consisting of two natural gas fired boilers in parallel, water distribution system, circulating pumps, distribution pumps (and associated space heating equipment). Boilers shall be of the low NOx type of 30 ppm or less. The heating system shall be capable of providing heat for the building air ventilation systems. The heating water piping system shall be used to circulate hot water to the heating equipment during the heating season of Sep 15 to May 15. Piping shall utilize reverse-return configuration. The heating system designs shall meet the requirements of Technical Specification 15569 WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH and, unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and Terminology of HVAC&R guide. The heating system design shall include safeguards to protect against freezing damage. Hot water pipe velocities shall be sized to not exceed 5 feet per second.

1.11.1 Boilers

The hot water supply shall be heated to 200 °F and supplied by two natural gas-fired, cast iron, fire-tube or water-tube type boilers rated for a pressure of 30 psig. Each boiler shall be provided with a forced-draft unless noted otherwise,and modulating burners and shall be interlocked with the hot water pump flow sensor to provide a continuous flow of hot water to the facility at outdoor temperatures below 60 degrees F. (adjustable). The hot water system supply temperature to the space shall be automatically controlled by manufacturer's standard controls. The boilers shall be interlocked with the heating water circulating pumps, through the control system, such that the boilers' burner can not fire unless flow is present through the boiler's piping system. There shall be a heating water circulation pump per boiler, three-way valve and two distribution pumps arranged in parallel. The boilers shall have a minimum efficiency of 85 percent but, shall meet low NOx requirements of 30 ppm or less. The use of a natural draft boilers shall not be allowed. Boiler reset shall be 200°F @ 0°F OA & 120°F @ 72°F.OA in the secondary loop.

a. If a high efficiency (condensing type) boilers are provided, to meet high efficiency requirements and low NOx requirements, the hot water shall be supplied at a lower temperature i.e.. 140°F supply and returned at 120°F. All heating coils, pumps, and hot water heating equipment shall be sized an selected for these temperatures to ensure all equipment is sized larger to take into account the lower return temperature upon which these boilers are normally selected. The use of a natural draft boilers shall be allowed if the minimum efficiency of 85 percent and low NOx 30 ppm or less can be met at the site elevation and boilers are less than 1,000,000 Btuh.

b. A packaged boiler plant control panel shall sequence the boiler's to provide the required capacity. It also, shall rotate the boilers for equal run time on a time clock schedule. The heating hot water temperature reset shall be accomplished by primary/secondary loop such that return temperatures to boilers are maintained above 120°F. The primary loop to boilers shall allow full flow through operating boilers at all load times. Lead boiler shall run at outside temperatures below 60°F. OA.

1) Boiler Control

The lead boiler shall be energized in response to a system demand. After an adjustable time delay, to allow the boiler firing sequence to elapse, the controller shall begin modulating the lead burner upward from the ignition starting point at a rate proportional to the system temperature rate of change and gain setting. If the lead boiler should fail the lag boiler shall be energized. The lag boiler shall begin modulating at the ignition start point, after a time delay, and proceed according to system rate of change and gain setting. As the system temperature rises, control shall decrease the modulation of the lag boiler so as not to over shoot the set point.

1.11.1.1 Boiler Connections

Design of boiler connections and auxiliary equipment shall conform to the requirements of ASME Boiler Code.

1.11.1.2 Low-Water Cutoffs

Float-type safety water feeders with low water cutoffs shall be provided for the hot-water boilers.

1.11.1.3 Water Column Connections

Provide crosses at right-angle turns on water column connections to boiler.

1.11.1.4 Smoke Connection

Boiler flue stack connections shall be in accordance with NFPA 211. Also, see paragraph Vents and Stacks.

1.11.1.5 Boiler Flue Termination

The boiler flue shall extend up through the roof of the building. The flue shall be provided with a rain cap fitting.

1.11.1.6 Boiler Location

The boilers and all associated fuel burning equipment shall be located in mechanical/electrical room.

1.11.2 Heating Water Distribution Pumps

The heating water shall be circulated by two parallel base mounted, end-suction, centrifugal pumps with mechanical seals. Each pump shall be sized for 100 percent of the maximum required heating water flow and 100 percent of the maximum system head pressure. The pumps capacity shall be based on a 200°F. supply and 180°F. return water. The pumps shall be non-overloading allowing the pump to operate at any point on its characteristic curve. Each pump shall be provided with a suction diffuser

and shall be mounted on a 6-inch thick concrete housekeeping pad. Each pump shall be provided with a calibrated bronze balancing valve (venturi), check valve and shut-off valves. Pumps shall run at outdoor temperatures below 60°F. If one pump should fail, the other stand-by pump shall start (providing 100% of the full flow capacity). Pumps shall alternate starting and have run-time meters. Pump flow rate (and head loss) shall be corrected for glycol. This corrected flow rate shall be used in selecting all other equipment i.e.. coils.

a. Pump Control

The boiler circulation pumps shall start and stop with their respective boilers. A flow switch in the heating water return line to each boiler in the production loop shall allow the boiler to fire, only after flow has been established through the boiler. The heating water distribution pumps shall be controlled to run in a lead-lag configuration when the outdoor air temperatures is be below 60°F, so that only the lead pump shall operate.

1.11.3 Expansion Tanks

A floor mounted bladder type expansion tank shall be provided in the heating hot water piping systems. The expansion tank's precharge pressure and acceptance volume shall be selected based on the design of the piping systems. The STRUCTURAL DESIGN ENGINEER shall be thoroughly consulted before hanging the tank from the structure.

1.11.4 Air Separation Tanks

The heating hot water piping systems shall be provided with an air separation tank. The air separator shall include an automatic air vent.

1.11.5 Water Treatment Systems

Provide a mixture of 35% propylene glycol and 65% water into the primary loop of both the heating systems. Provide a shot feeder (chemical feeder) at the heating water distribution pump to allow introduction of chemicals into the system and automatic glycol feeder. Provide the chemical treatment necessary to protect the heating system's equipment from damage due to corrosion and freezing.

1.11.6 Air handling Unit Coils

a. Each air handling unit coil shall be provided with a three-way control valve.

b. Leaving air temperatures for heating coils (except for preheat) shall be between 100 to 105°F.

c. Coils shall be selected with no more than 500 fpm coil face velocity.

1.11.7 Variable Air Volume Box Reheat Coils

Each VAV Box shall be provided with a two or three-way control valve. Leaving air temperatures for reheat coils shall be a minimum of 104°F at 40% of maximum air flow rate. Each VAV box shall be provided with a volume damper which allows only 40% of the maximum cooling air flow rate - when the box is in the reheat mode.

1.11.8 Piping

All piping shall be pitched up in the direction of flow, 1 inch in 40 feet shall be designed without pockets which would permit accumulation of air, and shall be provided with vents at high points and drains at low points.

1.11.8.1 Pipe Materials

All heating water piping within the facility shall be black steel conforming to ASTM A53, Schedule 40 or copper.

1.11.8.2 Pipe Joints

Heating water pipe joints shall be of the following types:

a. Heating water piping installed within the facility shall utilize threaded joints or welded joints. Welded joints and fittings shall be used for joints 2-1/2 inch and larger. Copper pipe joints 2 1/2 inch and larger shall be brazed. Grooved mechanical joints shall not be used.

b. Connections to equipment shall utilize unions for pipe 2-inch and smaller and flanges for pipe 2-1/2 inch and larger.

1.11.8.3 Pipe Expansion

In runs of pipe 50 feet and longer, or in shorter runs where design deems it necessary, indicate size on project drawings the location of all anchors, bends, loops, and pipe guides to adequately limit and provide for pipe expansion. Do not use expansion joints in piping unless absolutely necessary and justified. Anchors and guides shall be indicated on the project drawings and detailed for installation in the building structure provided. The STRUCTURAL DESIGN ENGINEER shall be thoroughly in formed of all forces generated.

1.11.9 Vents and Stacks

Stacks shall be in accordance with NFPA 211. Generally all stacks shall be of the prefabricated type with individual stack provided for each appliance. Stacks are generally used for forced draft applications. Vents shall conform to UL 441 and be Type B or per boiler manufacturer's recommendations. Vents are generally used for atmospheric burners only. Vents can be tied together to a main vent. Combined stacks shall not be used for appliances with power burners or draft fans. Stacks and vents can not be tied together. Height of stacks and vents shall be as required by NFPA 54 and shall be provided with a rain cap.

1.11.10 Heating of Mechanical Equipment Rooms

The mechanical equipment rooms shall be provided with a thermostatically controlled, hot-water, horizontal throw unit heaters to maintain a space temperature of 45°F. minimum. The unit heater airflow shall be directed toward the combustion air intake(s) in order to warm the combustion air.

1.11.11 Combustion Air

The mechanical equipment room shall be provided with combustion air stormproof louvers sized and located in accordance with NFPA 54. The combustion air stormproof louvers shall be provided without dampers and shall be ducted to within 12 inches of the mechanical room roof (in order to minimize the potential for piping freeze-up in the mechanical room due

to combustion air intake). High efficiency boilers shall have combustion air ducted to the units

1.11.12 Not Used

1.11.13 Low Intensity Infrared Radiant Heating

The use of low intensity infrared heating systems shall be provided in the apparatus bays 170a-e to offset natural building heat losses, infiltration and open overhead door losses (sized for 2 air changes per hour for door openings in apparatus room 175) and may be provided in breathing apparatus bays 170a-e, disinfection EMS/decon room , fire gear cleaning room, and fire extinguisher maintenance room in lieu of unit heaters. Radiant heat will not be permitted in any of the Office areas or areas with ceilings. High Intensity infrared heating is not permitted. The entire radiant heating system shall meet the requirements of Technical Specification 15565 HEATING SYSTEM, GAS-FIRED HEATERS, unless otherwise stated herein.

a. The entire heating system(s) supplied shall be design certified by the American Gas Association. System(s) shall be a gas fired vented low intensity radiant heating system(s) equipped for and adjusted to burn natural gas. System(s) shall be complete with burners, exhausters, tubular infrared emitters, shields, pre-wired control boxes, thermostats, and reflector and duct hangers. System shall provide sufficient radiant heating surface to attain a minimum steady-state thermal efficiency of 83 percent. After heater reaches operating temperature, all condensation shall cease and moisture shall exit the system in a vapor state.

b. Heaters shall conform to the requirements of ANSI Z83.6 with AGA label and shall be single-burner power vented, single-burner vacuum vented or multiple-burner vacuum vented. Maximum number of burners per exhauster shall be 2 for multiple burner/exhauster parallel or series systems. Each heater shall be provided with a gas pressure regulator that shall satisfactorily limit the main gas burner supply pressure. Heater style shall be tubular type.

c. System(s) shall be supplied ducted air from outside to each burner and end vent for the support of combustion. Intake shall be insulated sheet metal or PVC type as recommended by the heater manufacturer. Sidewall combustion air intakes shall be terminated with a manufacturer supplied intake hood, approved by A.G.A. Laboratories as suitable for each service. Combustion air sheet metal duct shall be provided in place of manufacturer's supplied intake hood with sidewall intakes. Provided with stainless steel bird screen. Combustion air roof intakes shall not be allowed.

d. Heaters shall be vented to the outside atmosphere and comply with NFPA 54 and NFPA 211. Vent shall be Type 316 stainless steel or high-temperature corrosion-resistant plastic rated for minimum 400°F. Plastic vents shall be acceptable only if they conform to the manufacturer's recommendations. Direct sidewall venting shall be terminated with a manufacturers supplied discharge vent approved by A.G.A. Laboratories as a suitable horizontal venting means. Provided stainless steel bird screen. Roof venting shall not be allowed.

1.11.14 Unit Heaters

Thermostatically controlled, hot water unit heaters are permitted in

non-administrative areas, disinfection EMS/decon room , breathing apparatus room 175, fire gear cleaning room, fire extinguisher maintenance room, and mechanical room. Unit heaters shall cycle on and off to maintain setpoint. Suspended ceiling cabinet unit heaters shall be provided near all corridor area exits; main entrance vestibule, near exterior exits. Thermostats shall be wall mounted 60 inches above finished floor.

1.11.15 Electric Resistance Heating

The use of electric resistance heating is not permitted.

1.12 HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS

This Section contains instructions and engineering requirements relating to the design of the new HVAC supply and distribution systems. The design of all systems shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks, to the requirements of NFPA Standards Nos. 30, 90A, 96, Terminology of HVAC&R and shall meet the requirements of Technical Specification 15895 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS. Mechanical ventilation and ventilation requirements for occupants shall provide the minimum outdoor air supply rates for occupants in heated or air-conditioned facilities, or both, required by ASHRAE Ventilation Standard 62. The cooling (ventilation) operation for the Apparatus bays 170a-e shall be based on removal of heat generated in ventilated areas so inside temperature shall not exceed 98.6°F. at design ambient temperature. Air distribution systems shall be designed to prevent infiltration at the anticipated prevailing wind. Design of variable air volume systems shall ensure proper ventilation rates at low and high system air flow by providing constant volume of outside air. Cooling shall be produced by mechanical ventilation and air conditioning. Equipment capacities and flows shall be corrected for altitude on drawings and included in notes on schedules. **The use of gas-fired "unit heaters & air-handling units or furnaces"**is not permitted except HVU-1 (serving the apparatus bays 170a-e, general ventilation vehicle exhaust and carbon monoxide system) may be indoor indirect gas-fired unit. Also, no track vehicle exhaust system is required.

a. Noise Criteria shall be in accordance with the following Noise Criteria unless otherwise indicated as follows:

1)	Equipment rooms	= 60 NC (max)
2)	Administrative/Office areas	= 30 NC (max)
3)	Lobby/Toilets/Corridors	= 40 NC (max)
4)	Conference rooms	= 32 NC (max)
5)	Dining	= 35 NC (max)
6)	Dorms	= 30 NC (max)

1.12.1 System Designs

All spaces in the facility including Dispatch/911 Communication room, radio communication closet, Electrical/UPS room, shall be heated and cooled by air-conditioning except for interior janitor's closets, areas requiring unit heaters (see paragraph UNIT HEATERS and in apparatus room 175) and interior storage closets. Vestibules, etc, shall be heated for freeze protection of sprinklers only (or Mechanical design shall be coordinated with the Fire Sprinkler Installation for freeze protection). Ventilation in rest rooms/lockers, handicapped toilets and janitor's closets shall be for odor exhaust only and shall be interlocked with AHU-1. Unheated or air

conditioned closets and storage areas in air-conditioned facilities shall be provided either directly with air conditioned air or provided with exhaust to transfer conditioned air to adjacent spaces. Building shall be maintained at a positive pressure when operating. Excess outside air shall first be relieved through areas generating odors (such as kitchen, toilet rooms & lockers, then through relief system and positive with respect to the apparatus bays 170a-e. Air handling Units, and heating and ventilating units not located in mechanical rooms shall be suspended on platforms or catwalks with perimeter railings for maintenance access. Heating and ventilation for Apparatus bays 170a-e shall be provided by suspended air handing unit(s) in the Apparatus bays 170a-e. Heating and ventilation air for other areas shall be provided by air handling units located at the following locations:

a. Variable air volume unit AHU-1 in Mechanical/Generator Room except dorm rooms shall have fan coil units.
b. Constant air volume unit HVU-1 suspended in Apparatus bays 170a-e.
c. Variable air volume unit AHU-2 suspended serving Dispatch/911 rooms and Communication room, Radio communication closet.

1.12.2 Air Handling Units

1.12.2.1 AHU System For "Dorm area"

a. AHU-1 in Mechanical Room serving the dorms, captain's office, library/crew meeting, Men's & Women's Toilet/Locker Rooms, physical fitness, dining room, laundry room, day room, kitchen, etc. shall be a modular type draw thru unit equipped with a glycol hot water pre-heating coil, glycol chilled water cooling coil, packaged electric or gas-fired humidifier and a combination filter/mixing section. An in-line return fan and relief louvered penthouse shall be provided for use of 100 percent outside air ventilation during economizer mode. The mixed air dampers shall modulate to maintain the mixed air temperature set point and the relief air dampers shall modulate to maintain a slightly positive building pressure, in response to the economizer thru the DDC. An intake louver shall be provided on an outside wall and shall be ducted to the top of the AHU mixing box section. The pre-heating operation shall be capable of supplying the minimum outside air required at a constant discharge temperature. Minimum outside air shall be relieved thru toilet/locker exhausts. The VAV air handling unit shall provide a variable volume of primary air, at a constant temperature, to VAV terminal units in the air handling system. The speed of the supply fan shall be modulated by a variable frequency drive to maintain a constant pressure in the air distribution system. Discharge air reset shall be provided. (ie. DAT = 55 °F. when RAT is greater than 78 °F. and DAT = 65 °F. when RAT is less than 70 °F. The speed of the return air fan shall also, be modulated by a variable speed drive to track the supply fan and to maintain building at a slightly positive pressure. Air flow stations on the return and supply air ducts to and from the return and supply air fans shall enable the return fan to track the supply fan. An air flow station shall be provided in the outside air duct to the air handling unit filter/mixing section to provide and maintain minimum outside air requirements. Economizer mode shall be disabled at temperatures above high limit and outside air damper returned to minimum position. When the economizer is inactive, the mixed air and relief air dampers shall be at their normal positions, in order to provide the minimum ventilation requirement which is exhausted through the toilet/locker exhausts. Mixed air reset shall also, be provided. The VAV box minimums shall be set to maintain the AHU minimum ventilation rate for a fully occupied facility. During unoccupied hours and warm-up mode, the

mixed air dampers shall be positioned for 100 percent recirculation and the relief air damper is closed. Each temperature control zone is to be served by a VAV terminal unit (this is to include each room identified on the Architectural plans to be air-conditioned and heated) which modulates the quantity of primary air supplied to each room with pressure independent controls, to maintain the temperature set point. When the damper in the VAV terminal unit closes to the minimum position, and the room temperature continues to drop, a control valve on the VAV terminal unit glycol reheating coil shall modulate open to maintain the room temperature set point. During the unoccupied and warm-up modes of operation, the VAV terminal unit dampers shall be at minimum position, and the VAV terminal unit heating valves shall be open. The air handling unit supply and return fans cycle to maintain the set back room temperature and to warm-up the rooms to the occupied heating set point during the warm-up mode of operation. See also, sequence of operation in section 15951 DIRECT DIGITAL CONTROL FOR HVAC.

b. Fan Coil Units serving the Dorm rooms: Fan coils shall serve the dorm's rooms only in lieu of VAV boxes. The fan coil unit shall be mounted above the suspended ceiling (if provided). The unit shall be provided with a glycol heating coil, glycol cooling coil, an outside air duct, a motorized outside air damper, a manual outside air balancing damper, a return plenum and supply plenum, if necessary. Fresh air for the room shall be drawn through the unit ducted from the outside and mixed with return air from the room. The unit shall be capable of adequately mixing the outside air and return air in order to provide supply air of uniform temperature regardless of whether the coil is operating. Supply air shall be ducted to one or more supply registers as necessary to provide even heating or cooling within the space. The unit shall be insulated to minimize sound transmission to the room. Piping to and from the unit shall be located above the ceiling. The unit shall be accessed by removing the acoustical ceiling panels. The motorized outside air damper shall be interlocked with the fan so that the damper opens only when the supply fan is running. Programmable thermostats shall be provided.

c. Variable air volume unit AHU-2 suspended serving Dispatch/911 rooms and Communication room, Radio communication closet shall be similiar to AHU-1.

1.12.2.2 AHU Systems Serving Apparatus Room

HVU-1 suspended in mechanical room or in apparatus bays 170a-e shall be an indirect gas-fired air handling unit. Exhaust fan (EF-4)shall be provided as part of the general ventilation for general ventilation vehicle exhaust system and ventilation of the apparatus bays 170a-e bays. Exhaust fan(s) EF-4 shall operate when HVU-1 operates in the 100% outside air mode. See paragraph VEHICLE EXHAUST SYSTEMS.

a. Exhaust fan (EF-4) shall operate for use of 100% outside air ventilation (economizer). The mixed air dampers modulate to maintain the mixed temperature set point and the exhaust air damper modulates to maintain a slightly positive building pressure, in response to the DDC. An intake louver shall be provided on an outside wall and shall be ducted to the top of the HVU mixing box section. The heating operation shall be capable of supplying the minimum outside air required at a constant discharge temperature and shall be selected with no more than 500 fpm coil face velocity. Minimum outside air shall be relieved thru exhaust fan (EF-4) operation. The air handling unit in the apparatus bays 170a-e shall be a single zone constant air volume system. During unoccupied hours and warm-up mode, the mixed air dampers are positioned for 100 percent

recirculation and the relief air damper is closed. The air handling unit supply fan cycles to maintain the set back room temperature and to warm-up the room to the occupied heating set point during the warm-up mode of operation.

1) Carbon monoxide detection shall be provided to monitor/control HVAC in the apparatus bays 170a-e. At levels above 25 ppm the HVU-1 shall start and provide 100% outside air and provide an alarm. At carbon monoxide levels below 25 ppm per CO sensors HVU-1 shall return to normal mode of outside air and de-activate alarm. Centralized control panel for CO (carbon monoxide) detection and control shall be an ACME CP-01-01E3R-0420 with four remote sensors No. 01-33AR or equal serving the apparatus room 175. Separate carbon monoxide detectors shall be provided in all dorm (sleeping rooms)including fire chief's dorm room.

2) Integrated general ventilation vehicle exhaust system shall be provided, providing general ventilation. See paragraph VEHICLE EXHAUST SYSTEM.

3) Supplemental infrared heating system(s) shall be provided. See paragraph LOW INTENSITY INFRARED RADIANT HEATING.

1.12.2.3 Self-Contained Packaged Humidifiers Serving AHU-1 & AHU-2

Unit shall be self-contained electrode steam humidifier. Humidifier assembly shall include a 20-gauge steel cabinet that houses replaceable canister with auto-flush, solenoid fill valve, pressure regulating orifice, and auto control circuit. The humidifier shall be serviceable without disconnecting the high-voltage power supply and shall not interrupt unit operation. Electrode wires shall be connected with quick connect fasteners.

a. Microprocessor control shall maintain humidifier operation through fill and drain cycles based on water conductivity. Overflow and loss of flow protection shall be provided along with a manual drain switch. A capacity adjustment potentiometer shall be provided. A high-water alarm with built-in time delay shall provide an audible and visual indication to change canister. Humidifier shall have full modulating control to provide 0 to 100 percent capacity. It must also provide a gradual increase in amperage in order to avoid undesirable surges of current. Humidifier shall be supplied with a solid state electronic sensor controller (humidistat) capable of fully modulating the steam flow.

b. The humidifier fill waterline shall have an air gap to prevent backflow (or siphoning) of contaminated water into the water supply system. Water fill lines shall also have a water seal between a fill cup and the steam generator to prevent backflow of steam vapor when the drain valve is activated.

c. Humidifier shall incorporate electrical terminals for installation of controlling stat, duct high-limit stat, interlock switch to fan motor and/or to sail switch in duct. Humidifier shall be supplied with a steel steam dispersion-tube which provides uniform steam distribution over the entire tube length and shall be supplied at various lengths to adequately span the widest dimension of the duct. Steam hose from generator to dispersion tube shall be of reinforced rubber to adequately convey steam to the tube and to drain any condensate back to the generator.

d. In lieu of electric, gas-fired humidifiers may be provided.

1) GAS TO STEAM HUMIDIFIER

Tank and cover shall be constructed of 14-gauge stainless steel with Heli-arc welded seams.

Burner assembly shall be AGA/CGA/CSA certified and tested. Gas train assembly shall be complete with burner/mixing tube assembly, igniter, sight glass, flame rod electrode, gas manifold, integral gas valve and venturi.

Each burner shall be freely modulating with a gas input turndown ratio of up to 4:1.

The gas-to-steam humidifier shall support sealed combustion to allow air for combustion to be mechanically induced from outside the building via dedicated piping, to a PVC connection.

The gas-to-steam humidifier shall be floor stand mounted.

Heat exchanger shall be tubular stainless steel connected to a stainless steel flue box.

The gas-to-steam humidifier shall be capable of generating steam from hard water.

The unit shall contain the following operational and maintenance features:

1. Water makeup valve control

2. Real time/drain and flush

3. End-of-season drain

4. Low water cutoff

5. Modulating steam control

6. Aquastat freeze protection

7. Surface skimmer

8. Support legs

9. Factory insulation

10. Blocked flue safety

11. Service access port

12. Removable cleanout plate

13. Brass Body Fill Valve

A microprocessor-based controller shall be provided and be capable of fully modulating (0-100%) control of humidifier outputs, as well as control of all fill and drain functions.

The electronic controller shall be interoperable with Honeywell Controls building management system.

A keypad, capable of either unit or remote mounting, shall be provided. The keypad shall be capable of monitoring and/or controlling the following parameters:

1. Relative humidity (RH) set-point and actual conditions in the space (from humidistat or humidity transmitter)

2. Relative humidity (RH) set-point and actual conditions in the duct for variable air volume applications

3. Relative humidity (RH) high limit set-point and actual conditions

4. Total system demand in % of total humidifier capacity

5. Total system output in lb/hour

6. Real time drain and flush

7. End-of-season drain

8. System Fault indicator

The unit shall be supplied with a stainless steel dispersion assembly complete with calibrated, thermal plastic orifice tubelets rated to a continuous temperature of 450°F. The connection between the gas-to-steam humidifier and the dispersion tube assembly shall also be provided.

Accessories
1. Air flow proving switch

2. Duct high limit humidistat

3. VAV control

The gas-to-steam humidifier shall be supported with a warranty that ensures the product will be free from defects in materials and workmanship for a period of two years after installation or 27 months from shipment.

1.12.3 Filtration

Indoor air quality is of primary concern, the combined supply air, including return and outside air, shall be filtered by a combination of 30 percent efficient pre-filter(s) and 85 percent final filter as determined by the dust spot test specified in ASHRAE Standard 52.1.

1.12.4 Ductwork

Supply air duct systems for variable air volume systems shall be sized using the static regain method. Supply air ducts from VAV air handling units to VAV boxes shall be built to at least medium pressure standards and class A seal requirements. All other duct shall be low pressure and built to low pressure and class c seal requirements. Offices and dorm rooms shall be individually zoned. Communication/radio communication rooms, Electrical/UPS room, shall be served by individual fan-powered VAV boxes. All other ductwork shall be sized using the equal friction method with 0.07 inch per 100 feet for supply ducts and 0.1 inch per 100 feet for return and exhaust ducts. Ductwork shall be metal except for fan connections. Ductwork serving Administrative areas shall typically be run above the ceiling in the corridors. Return ductwork shall be used in all

air-conditioned areas for all fan-powered VAV boxes ducted back to the respective rooms they serve. There shall be 15 feet of return air duct to an air handling unit provided with acoustical liner 15 feet. This is the minimum amount of return air duct that will be accepted for each air handling unit. Flexible ductwork shall never exceed 6 feet in length.

a. Duct Construction

All ductwork shall be constructed from galvanized sheetmetal, in accordance with SMACNA guidelines. All exposed ductwork shall be oval or round and painted to match adjacent areas.

1.12.5 Variable-Air Volume Boxes

VAV Boxes shall be concealed above ceiling of the controlled space and provide varying amounts of conditioned air in response to a space thermostat. All VAV boxes shall be equipped with a hydronic reheat coil with two or three-way control valve. The minimum heating air volume flow rate shall be set for 40% of the full cooling air flow rate.

1.12.6 Ceiling Mounted Supply Diffusers

Ceiling diffusers shall be suitable for use in a lay-in ceiling or a gyp board ceiling and shall be located as necessary. All new diffusers shall be provided with a 4-way adjustable discharge pattern; standard diffusers with fixed discharge patterns are not permitted. Diffusers shall be sized to distribute the required quantity of air evenly over the space intended without causing noticeable drafts, air movement faster than 50 feet per minute in the occupied zone, or causing dead spots anywhere in the conditioned space. (Maximum velocity of 500 fpm with a NC of 30 maximum). Maximum diffuser size shall be 24x24 inches.

1.12.7 Ceiling Mounted Return Grilles

Ceiling return air grilles, suitable for use in lay-in ceilings or gyp board ceilings, shall be located as necessary. The maximum size of return grilles shall be 24x24inches. Return grilles shall not be located close to outdoor openings or in locations where bypassing of supply air may occur. Recommended return air velocities based on free area of the opening shall be 500 fpm.

1.12.8 Supply and Exhaust Fans

Except for wall mounted propeller units, all fans shall be centrifugal type and connected directly to weather-proof and stormproof louvers using ductwork. Low leakage motorized dampers shall be provided. Fans larger than 2000 cfm in capacity shall be provided with V-belt drives. Care shall be taken to ensure that the noise level generated by exhaust fans and associated relief stormproof louvers is not transmitted to the exterior of the building. In-line fans located outside the main mechanical/generator and mechanical/electrical areas shall be the provided with a manufacturers standard acoustical enclosure to inhibit noise transmission to the adjoining occupied spaces. Sone value of fans measured 5 feet from fan inlet shall be less than 30 sones outside the mechanical equipment rooms. Sound transmission data shall be submitted for approval and design shall indicate noise criteria on schedules. Mechanical rooms having a boilers shall be provided with supply fan for ventilation purposes in lieu of an exhaust fan.

1.12.9 Outdoor Intakes and Exhausts

Outdoor air intakes shall be located in areas where potential for air contamination is lowest, such as away from overhead doors. Maximize the distance between intakes and exhausts by maintaining a minimum distance of 15 feet between intakes and exhausts and 24 feet between intakes and toilet, janitor's closets, etc.. Motorized low-leakage damper with blade and jamb seals, shall be provided at all outside air intake and exhausts at the building's exterior surfaces. If feasible, locate intakes and exhausts on different building faces. Maximum velocity through net area of air intakes shall be limited to 500 fpm. Required air flow shall be corrected for altitude.

1.12.10 Special Requirements

1.12.10.1 Toilets/Locker Rooms

The toilets/lockers shall be exhausted at the rate of:

1)
   a. 0.5 cfm exhaust per sq. foot for lockers
   b. 2.0 cfm exhaust per sq. foot for toilet area
   c. 2.5 cfm exhaust per sq. foot for shower area

In order to maintain a negative room pressure.

Or

2) The VAV AHU-1 minimum outside air requirement of 20 cfm outside air per person for the Administrative area of the building evenly exhausted and distributed in both Men's & Women's Toilets/lockers whichever is greater of (1)a,b,and c combined.

The required make-up air for the exhaust system shall be supplied by VAV boxes to supply air for the heating/cooling loads (through VAV air handling unit AHU-1) and through door grilles with fire damper or transfer ducts (sized for a velocity of 500 fpm.

1.12.10.2 Janitor's Closets

The janitor's closets shall be exhausted at the rate of 2.0 cfm exhaust per sq. foot in order to maintain a negative room pressure. The required make-up air for the exhaust system shall be supplied through a door grille with fire dampers (sized for a velocity of 500 fpm).

1.12.10.3 Mechanical Equipment Rooms

The mechanical equipment rooms including breathing apparatus room, disinfection EMS/decon room , and fire extinguisher maintenance room, shall each be ventilated and cooled with outside air by thermostatically controlled fans; set to operate when the respective space temperature exceeds 85°F. Size of fan shall be based on removal of heat generated in room so inside temperature shall not exceed 98.6°F at design ambient temperature, but the system design shall not be less than 10 air changes per hour. Sone values of fans measured 5 feet from fan inlet shall be less than 20 Sones.

1.12.10.4 Boiler Room (Mechanical room)

The boiler room shall be ventilated and cooled with outside air at a minimum rate of 20 AC/hr by a thermostatically controlled supply fan set to operate when temperature exceeds 85°F.

1.12.10.5 Laundry Room Exhaust

A 4-inch duct stub out shall be provided for each dryer in the Laundry room. The dryer exhaust ductwork shall not terminate over a walkway or near a door. If necessary, exhaust fans shall be provided as part of the dryer exhaust systems, i.e.. when travel distance exceeds 20 feet. Alternatively, because of the requirement for only two dryers in the laundry facility and because the dryers are electrically heated, it will not be necessary to directly supply the laundry room with make-up air. A louvered or undercut door or transfer duct (sized for 500 fpm) shall be required to allow for replacement air to the dryers.

1.12.10.6 Not Used

1.12.10.7 General Ventilation Vehicle Exhaust System

The design of all systems shall comply with ASHRAE handbooks and Standards, and to the requirements of NFPA Nos. 30, 90a, 90b, 91, and 1500 and OSHA Standards. Testing shall be done for compliance prior to acceptance of the building. The general ventilation vehicle exhaust system for the fire trucks shall be a general ventilation system that runs all the time, no overhead flexible ducts. The exhaust fan connected to the exhaust ducts shall be provided with make-up air from the HVU-1. This air is then exhausted through EF-4. The building shall be ventilated by drops between adjacent bays that are 18X18 inches rectangular metal ducts 2310 cfm each extended down from the overhead common duct to within 41 inches above the floor (with mesh birdscreen over opening), total of six shall be provided. Support of these duct drops shall be made by use of non-load bearing duct support ("columns"). General ventilation shall be sized for a minimum 17,360 cfm and is required. This ventilation system shall be interlocked with the heating and ventilating unit HVU-1 and carbon monoxide (detectors) system provided and required by paragraph AHU SYSTEMS IN APPARATUS ROOM. Four carbon monoxide detectors shall be provided in the apparatus room 175, 12 inches above the finished floor one on each wall.

1.12.10.8 Communication/radio communication rooms, Electrical/UPS room,

a. Communication/radio communication rooms, Electrical/UPS room, shall be provided with dedicated fan-powered VAV box or boxes and cooled by AHU-1 see paragraph "Air Handling Units" for design conditions, inside design conditions, cooling loads requirements, and minimum ventilation requirements. Supply and return ductwork shall be provided for the room.

b. Dispatch/911 rooms, Communication rooms, and Electrical/UPS room, shall be provided with dedicated fan-powered VAV box or boxes and cooled by AHU-1 see paragraph "Air Handling Units" for design conditions, inside design conditions, cooling loads requirements, and minimum ventilation requirements. Supply and return ductwork shall be provided for the room.

c. Battery and UPS's area(s) shall conform to the following:

1) The battery area shall be ventilated, by powered ventilation systems to limit hydrogen accumulation to less than an explosive mixture. Failure of a continuously operated or automatically controlled powered ventilation system required by design to limit hydrogen accumulation to less than an

explosive mixture shall be annunciated. Each Battery room shall have ventilation, forced ventilation, to keep the flammable hydrogen gas concentration below 2-percent by volume.

2) The power ventilation system for the battery room shall be separate from ventilation systems for other spaces. Air recirculation in the battery room is prohibited.

3) Electrical hazardous areas shall be as indicated in section 01007 ELECTRICAL REQUIREMENTS.

4) Each blower shall have a non-sparking fan.

5) When the batteries are arranged in two or more tiers, each shelf shall have at least 2 inches of space front and back for circulation of air. Cell ventilation openings shall not be obstructed.

6) Operational battery areas where batteries are used for emergency power or other operations and recharged regularly shall conform to the following:

a. When a battery is being recharged, it produces approximately 0.016 cubic foot per hour of hydrogen gas per ampere per cell.

b. Maximum charging current of battery charger(s) =
Maximum number of batteries to be charged at any given time =
Number of cells per battery =
Maximum battery capacity in ampere-hours =

c. The amount of ventilation air required for the room shall be in accordance with the following formula:

$$Q = (0.016 \times I \times N / C \times K)$$

Where: Q = Required ventilation rate in cubic foot per hour.

I = 0.21 x (Capacity of the largest battery to be charged in ampere-hours) or 0.25 x (The maximum obtainable amperes from the charger), whichever is greater.

N = (Number of batteries to be recharged at one time) x (Number of cells per battery). A single cell normally has 2 DC volts. A 12-volts battery usually has six cells connected in series. A typical 6-volts battery has three cells.

C = Allowable concentration of hydrogen gas, 0.02.

K = Safety Factor to allow for complete mixing, use 4.

EXAMPLE: A battery room has twenty 12-volts DC batteries. Each battery has 10 ampere=hours capacity and 6 cells. The room is equipped with a battery charger having 50 amperes maximum obtainable current. The current I should be the greater of the two numbers 0.21 x 10 = 2.1 and 50 / 4 = 12.5 which is 12.5 amperes. The number of cells N is 20 x 6 = 120, so the minimum ventilation rate required for this room is (0.016 x 12 / 5 x 120 / 0.02) x 4 = 4800 cubic foot per hour.

DESIGN INFORMATION REQUIRED:

Capacity of the largest battery to be charged in ampere-hours = MAF 720, LF

600 battery model
Number of batteries to be recharged at one time = 60
Maximum obtainable amperes from the charger = 150
Number of chargers = 8
Number of cells = 8

NOTE: COMPARE THE Q VALUE OBTAINED WITH 4 AC/HR, AND USE THE LARGEST VALUE.

7) The power ventilation system shall be interlocked with the battery charger(s) so that the battery cannot be charged without ventilation.

8) Multiple speed fans should be considered when two or more battery chargers are used in a room.

1.13 CHILLED WATER SYSTEMS

These systems shall meet the requirements of Technical Specification 15181 CHILLED WATER AND CONDENSER WATER PIPING AND ACCESSORIES and 15620 LIQUID CHILLERS unless otherwise stated, shall comply with the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbooks and ASHRAE 15.

a. Each air handling unit coil shall be provided with a three-way control valve.
b. Coils shall be selected with no more than 500 FPM coil face velocity.
c. Cooling coil discharge temperature shall be designed between 52 -57°F.

1.13.1 Refrigeration System.

The refrigeration system shall be a split system consisting of an exterior 6-inch thick pad-mounted air-cooled condensing unit (Minimum EER = 10.0) and liquid cooler (evaporator) located in the mechanical room. Outside units shall be provided with manufacturer's standard packaged controls. DX evaporators shall be provided with double suction risers where suction line is trapped or rises above the evaporator. The condensing unit (with hail guard) shall be provided with at least four steps of capacity reduction. Refrigeration equipment provided shall have an ozone depletion factor of 0.05 or less. HCFC-22 shall not be allowed. HCFC-22 alternatives shall be documented in the design analysis and catalog cuts provided for three manufacturer's before an alternate refrigerant equipment will be allowed. Where applicable in lieu of air-cooled condensing unit specify screw type compressors for construction projects when applicable. Additionally, need to assure that vibration dampening is installed where needed. Low ambient operation shall be provided for to 45°F.

1.13.2 Filtration.

Indoor air quality is of primary concern, the combined supply air, including return and outside air, shall be filtered by 25 percent efficient filter as determined by the dust spot test specified in ASHRAE Standard 52.1 and particulate removal efficiency in ASHRAE Standard 52.2.

1.13.3 Other Systems

The use of evaporative cooling, heat pump and dx coil type systems will not be permitted.

1.13.4 Chilled Water Distribution Pumps

The cooling water shall be circulated by two base mounted, end-suction, centrifugal pumps with mechanical seals. Each pump shall be sized for 100 percent of the maximum required cooling water flow and 100 percent of the maximum system head pressure. The pumps capacity shall be based on a 55°F return and 45°F supply water. The pumps shall be non-overloading allowing the pump to operate at any point on its characteristic curve. Each pump shall be provided with a suction diffuser and mounted on a 6-inch thick concrete housekeeping pad. Each pump shall be provided with a calibrated bronze balancing valve (venturi), check valve and shut-off valves. Pumps shall run at temperature above 65°F (adjustable). If one pump should fail, the other stand-by pump shall start providing 100% of the full flow capacity. Pumps shall alternate starting and have run-time meters. Pump flow rate (and head loss) shall be corrected for glycol. This corrected flow rate shall be used in selecting all other equipment i.e.. coils.

a. Pump Control

A flow switch in the cooling water return line to each evaporator in the production loop shall allow the condensing unit to energize, only after flow has been established through the evaporator. The cooling water distribution pumps shall be controlled to run in a lead-lag configuration when the outdoor air temperatures is be above 65°F, so that only the lead pump will operate.

b. Hydronic Accessories:

1) Expansion Tanks

A floor mounted bladder type expansion tank shall be provided in the chilled water piping systems. The expansion tank's precharge pressure and acceptance volume shall be selected based on the layout of the piping systems. The STRUCTURAL DESIGN ENGINEER shall be thoroughly consulted before hanging the tank from the structure.

2) Air Separation Tanks

The chilled water piping systems shall be provided with an air separation tank. The air separators shall include an automatic air vent and make-up water system, consisting of a pressure reducing valve, strainer, reduced pressure type backflow preventer and isolation valves.

3) Water Treatment Systems

Provide a mixture of 35% propylene glycol and 65% water into the primary loop of the cooling systems. Provide a shot feeder (chemical feeder) at the cooling water distribution pumps to allow introduction of chemicals into the system and automatic glycol feeder. Provide the chemical treatment necessary to protect the cooling system's equipment from damage due to corrosion and freezing.

4) Air handling Unit Coils

Each air handling unit coil shall be provided with a three-way control valve.

5) Piping

All piping shall be pitched up in the direction of flow, 1 inch in 40 feet shall be designed without pockets which would permit accumulation of air, and shall be provided with vents at high points and drains at low points.

6) Pipe Materials

All cooling water piping within the facility shall be black steel conforming to ASTM A53, Schedule 40 or copper.

7) Pipe Joints

Cooling water pipe joints shall be of the following types:

a. Chilled water piping installed within the facility shall utilize threaded joints or welded joints. Welded joints and fittings shall be used for joints 2-1/2inches and larger. Copper pipe joints 2 1/2 inches and larger shall be brazed. Grooved mechanical joints shall not be used.

b. Connections to equipment shall utilize unions for pipe 2 inches and smaller and flanges for pipe 2-1/2 inches and larger.

8. Pipe Expansion

In runs of pipe 50 feet and longer, or in shorter runs where required, indicate size on project drawings the location of all anchors, bends, loops, and pipe guides to adequately limit and provide for pipe expansion. Do not use expansion joints in piping unless absolutely necessary and justified. Anchors and guides shall be indicated on the project drawings and detailed for installation in the building structure provided. The STRUCTURAL DESIGN ENGINEER shall be thoroughly in formed of all forces generated.

1.14 BUILDING TEMPERATURE CONTROL SYSTEMS

This Section contains instructions and engineering requirements for the design of the building temperature control systems required for the operation of the building mechanical systems. The temperature controls shall be Williams Electric Company temperature controls and UCS system provided by the Contractor. All DDC functions in the HVAC system shall be controlled and monitored by the EMCS. The design of the control systems for the HVAC equipment shall be in accordance with Technical Specification 15951 DIRECT DIGITAL CONTROL FOR HVAC. Williams Electric Company shall re-program the head-end computer to accommodate the facility and provide equipment and services, including software database programming, graphics generation, calibration and end-to-end testing of the head-end computer and this project's remote DDC panels, and temperature control panels. EMCS fiber shall be extended in accordance with Section 01007 ELECTRICAL REQUIREMENTS as attached. The control system shall be designed to provide continuous and automatic control of all HVAC equipment. Where equipment is provided with a packaged control system, such as in the case of a boilers or chillers, the building control systems shall interface with the equipment's packaged control systems. The temperature control panels shall be located in the mechanical room(s). The number of control panels shall be dictated by the number of and types of equipment in the final design. This type of control system(s) allows an EMCS operator to easily adjust

setpoint, operating times and other system parameters, if and when necessary, after the building has been occupied.

a. Notwithstanding Section 00700 Contract Clauses FAR 52.236-5, Material and Workmanship, for the DDC/EMCS shall be manufactured by Williams Electric Company. No other product will be acceptable. The competition Advocate authorizes sole source procurement.

1.14.1 General DDC Requirements

All mechanical systems and equipment, shall be controlled by local direct digital control (DDC) panel(s) located in each facility Mechanical room(s). One EMCS panel shall be provided in the facility. The DDC panel(s) shall operate in a stand alone fashion. A Williams Electric Company temperatures control and UCS design shall be provided, using Technical Specification Section 15951 DIRECT DIGITAL CONTROL FOR HVAC as attached. To facilitate maintenance and to allow manual starting and stopping of equipment by maintenance personnel, a hard-wired Hand-Off-Automatic (HOA) control switch shall be provided for each new major piece of equipment (air handling unit, pump, exhaust fan, etc.) in order to override the automatic DDC start and stop functions. Coordination with and input from the Base, and existing facility User has been required in order to ensure that the appropriate system points are monitored.

a. Fire alarm condition on any fire alarm circuit shall automatically initiate the deactivation of the air handling units throughout the building.

b. All computing devices, shall be as defined in FCC Rules and Regulations FCC Part 15, and shall be certified to comply with the requirements for Class A computing devices and labeled as set forth in FCC Rules and Regulations FCC Part 15.

c. Temperature Control Contractor Experience - The temperature control Contractor shall have a working knowledge of existing system and experience installing these systems. The Contractor shall provide for approval the names and qualification of supervisory personnel (ie. Project Manager and /or Superintendent) that will be used on this project. The Contractor shall also provide a list of references to be contacted from recent projects on which the proposed personnel performed similar duties. Approval shall be based on previous experience with the existing EMCS (UCS) system, qualifications and demonstrated ability of proposed personnel to manage resources in an efficient and effective manner. Experience and supervisory personnel qualifications must be submitted and approved before submittal of any technical data.

d. Emergency Service - The Government will initiate service calls when the installed DDC/EMCS is not functioning properly. Qualified personnel shall be available to provide service to the complete DDC/EMCS installed under this project. Qualified personnel shall be defined as a factory trained journeyman in the brand of control system provided, this level of training shall be considered a minimum. The Government shall be furnished with a telephone number where the service supervisor can be reached at all times. Service personnel shall be at the site within 8 hours after receiving a request for service. The control system shall be restored to proper operating condition within 3 calendar days after receiving a request for service.

e. Software - The Contractor shall provide all software updates and verify operation in the system. These updates shall be accomplished in a timely

manner, fully coordinated with base operators, and shall be incorporated into the operations and maintenance manuals, and software documentation provided as submittals in section 15951. There shall be at least one scheduled update near the end of the first year's warranty period, at which time the Contractor shall install and validate the latest released version of the Contractor's software.

f. All utility meters shall be connected to the existing EMCS system to allow the necessary monitoring.

g. Fuses shall not be used for surge protection.

h. System descriptions and analyses submittal shall include "and shall indicate how new system will interface with the existing Fort's EMCS as manufactured by Williams Electric Company".

i. Scheduled inspections shall be at the beginning of construction.

j. Temperature sensors for the DDC controllers shall be selected to be standard Platinum 100 Ohm elements which would permit their use with electronic or DDC controls from other sources of supply. Other readily available control devices or standard commercial grade control devices as normally sold by the major temperature controls companies and necessary for control system operation shall be specified.

1.14.2 Existing Williams Electric Company EMCS Interface

The control system serving the facility shall be a system expansion of, and sourced to match, the existing Fort's EMCS (UCS). All services, materials, equipment, hardware, and software necessary to install the EMCS expansion and for interfacing to the existing system shall be provided. At the completion of the system expansion, all the new control panels and input and output control points/devices shall be fully integrated into the existing system.

a. Operator Access

Access to the system expansion by the Fort's EMCS operators shall be seamless via the existing work stations on the EMCS LAN and the expansion connections to it. That is, it shall require no different hardware or software or operation steps to access than any of the control panels on the existing system. System expansion access shall allow an EMCS operator to perform the following real-time functions on the new equipment using the same work stations and software required for accessing the existing EMCS:

1) Display the status of all inputs.

2) Display and manually change the status of all outputs.

3) Display and adjust all control loop and all other permanent (battery-backed RAM and/or EEPROM-based) database parameters.

b. Graphic Screens

Provide and integrate graphic display screen files into the existing system, each consisting of a schematic diagram of a mechanical system with real-time statuses of new inputs and outputs superimposed upon the schematic diagram. In conjunction with existing software base packages, the screens shall allow an operator to not only view, but also command

changes to the statuses of all outputs.

c. Alarm Monitoring

Alarm monitoring shall be provided for all major pieces of equipment. Indication of failure shall alarm at the existing EMCS Operators Work station. The maximum allowable time for the EMCS to display an alarm condition is 10 seconds starting from the time the alarm condition first exists. The maximum allowable time for equipment to respond to manual EMCS commands is 10 seconds starting from the time the command is initiated at the work station. The system expansion shall not impede the capabilities of the EMCS to meet these requirements. Alarm monitoring shall include, but not be limited to the following alarm indications:

Loss of flow
High and low temperature
High and low humidity
Loss of commercial power
High and low pressure
Freeze detection
Summary alarm
Start/stop actual status different from commanded state
Carbon monoxide sensors
Duct Smoke detectors
Filter pressure differential gauges

Each start/stop is to be paired with a true status input. EMCS alarms shall be generated whenever the status input state varies (longer than some adjustable time delay) from the corresponding output's matching state.

1.14.2.1 Not Used

1.14.2.2 Controllers

Except in the case of application specific controllers (ACS), All modulating mechanical processes (e.g., temperature, pressure, flow control) shall be controlled directly by the local DDC control panel. Except for safety and protection functions, software logic shall be used in lieu of relay logic. The contacts of safety and protection function instruments shall be hardwired in series with the common side of each equipment's HOA switch, and their proper operation shall not depend in any way upon the DDC.

1.14.2.3 Digital Controllers

Digital controller blocks or points within the control panels shall utilize a full proportional algorithm. Digital controller blocks or points within the control panels shall utilize a full proportional-integral-derivative (PID) algorithm which can provide the following combinations of control modes: P, PI, PD, and PID. Controllers shall eliminate integral windup when controlled equipment is shutdown. Provide remote adjustment capabilities for the following parameters via the normal existing EMCS operator interface:

a. Input manual/automatic.
b. Input value in engineering units (when in manual).
c. Proportional, integral, and derivative gains.
d. Direct/reverse action.
e. Output manual/automatic.
f. Output value in percent of full output range (when in manual).

g. Anti-windup initiation.

1.14.2.4 Stand-Alone Operation

The local control panels, although fully integrated into the existing EMCS network, shall be capable of stand-alone operation in the event of a complete failure of the network. When communication is lost with the network, local programs, including those based upon real-time clock or calendar events, shall continue to function without operator intervention. "Local" or "non-global" programs are considered to be those which are not dependent upon multiple controllers for either input information or output actuation. A program which requires a shared input, or "global" value, communicated over the network from another controller (e.g., a boiler temperature reset based on outside air temperature) shall continue to operate with the last valid value received prior to a loss of communication.

1.14.3 Input/Output Devices

The control system shall utilize off-the-shelf input and output instruments (e.g., RTD sensors, actuators, relays) which are commercially available from third party vendors and who are independent from the DDC panel manufacturers.

1.14.4 Analog Sensors, Digital inputs & Digital outputs

All sensing devices shall be capable of removal from the system without disruption of service to the system in which they are installed. Sensors, digital inputs and outputs provided shall include, but not limited to, the following:

Supply air, return air, & outside air; Air Flow Measuring Stations (to be shown on mechanical HVAC drawings)
Boiler inlet temperature
Boiler outlet temperature
Boiler fuel flow
Boiler water reset
Heating water flow
Chilled water flow
Chilled water inlet temperature
Chilled water outlet temperature
Space temperature(s) (to be shown on mechanical HVAC drawings)
Outside air temperature sensors (to be shown on HVAC mechanical drawings)
Mixed air temperature sensors (to be shown on HVAC mechanical drawings)
Discharge air temperature sensors
Preheating Coil Controls
Heating Coil Controls
Chilled water Cooling Coil Controls
Hot water pump(s) status
Hot water pump(s) start/stop
Chilled water pump(s) status
Chilled water pump(s) start/stop
Air handling unit(s) status
Air handling unit(s) start/stop
Return air fan(s) status
Return air fan(s) start/stop
Kilowatt meter
Gas meter
Water meter

HVU-1:
HVU-1 outside air damper start/stop
HVU-1 return air damper start/stop
Supply fan
Gas burner control
Discharge air average temperature (TSA) control
Space temperature status
EF-4 status
Fan Coil/Blower coil units Cooling Coil Controls
Fan Coil/blower coil units start/stop
Fan Coil/blower coil units status

Liquid flow measurement for use by the DDC system shall be performed by paddlewheel-type flow sensors only. Pitot-type sensing elements may be installed for local instrumentation used for testing and balancing purposes only.

1.14.5 Cable and Wiring

Cable and wire for the DDC system shall be separate from the distribution system serving any other system. All cable and wiring shall be installed in conduit. The data transmission media (DTM) shall be provided by the Contractor. DTM shall be as specified and extended as shown on the electrical drawings in accordance with section 01007 ELECTRICAL REQUIREMENTS.

1.14.6 Control Valves

Sizing of control valves shall take into account upstream and downstream fittings and shall be in accordance with Instrument Society of America standard ISA S75.01-1985.

1.14.7 Variable Air Volume Boxes

VAV boxes shall be fitted with DDC controllers and velocity sensors compatible with the existing EMCS. VAV box temperature sensors shall be located atop an associated return grille and be provided with 30 feet of sensor wire for future relocations. Where VAV air handling units with VAV boxes are provided, flow monitoring stations shall be provided to ensure proper indoor air quality when operating at minimum supply air flows.

1.14.8 Damper Actuators

All dampers shall be provided with 4-20 mA-operated damper actuators.

1.14.9 Valve Actuators

All valves shall be provided with 4-20 mA-operated valve actuators.

1.14.10 HVAC Control Drawings

HVAC control drawings, for both the 60 percent and Final submittals, shall be in accordance with SECTION 01336 - 60 PERCENT DESIGN REQUIREMENTS, & SECTION 01338 - 100 PERCENT DESIGN REQUIREMENTS. Control drawings for each facility shall include a system schematic section, an elementary (ladder) diagram, a detailed sequence of control, a list of required components with a brief description of each component, a control panel detail, legend and schedules, a listing of input and output points and a matrix showing the point type, alarms and applications programs associated with each of the

input or output points. EMCS details and points to be monitored shall be detailed on the contract drawings and follow the conventions as set forth in AFM 88-36. System I/O summaries shall be detailed.

1.14.11 Control Schematic

The control schematic shall be a schematic representation of the HVAC system and the associated control equipment. The control schematic shall be drawn to a large scale to allow for ample space to indicate any necessary performance parameters such as setpoint, etc.. The control schematic shall be cross referenced to the elementary diagram and the control panel detail by numbered terminal points. Each component shall be identified by a unique alpha-numeric designator such as S1 for sensor number 1. This provides a means of cross referencing to the description of components and the sequence of control. All major control items relative to the system shall be shown. This shall include, but shall not be limited to:

Supply Fans
Exhaust Fans
Filters
Cooling Coils
Heating Coils
Pressure Sensors/Switches
Flow Sensors/Switches
Freezestats w/manual reset
Duct Smoke Detectors w/connection to the FACP
Temperature Sensors
Valves and Valve Actuators
Dampers and Damper Actuators
VAV Boxes
Humidifiers
Gas Valves & actuators
Fan Coils units

1.14.12 Elementary Diagram

An elementary diagram or diagrams shall be provided showing the wiring of the control system devices. It shall be drawn to a large scale for easy reading and to allow space for indicating performance parameters. The elementary diagram shall be cross referenced to the control schematic and the control panel detail through the use of numbered terminal points.

1.14.13 Sequence of Control

The sequence of control is a written statement of the operation of the system. It should be as detailed and complete as possible and it should refer to individual components by their alpha-numeric designator whenever possible. The sequence shall break the overall system into sub-systems, such as supply fan control, humidification, dehumidification, mixed air control, pre-heating coil, heating coil control, cooling coil control, etc., and shall describe the operation of each of the subsystems. The sequence of control shall also describe the operation of all safety devices such as duct smoke detectors or freezestats, fire alarm interlock and shall describe the operation of the system in both the occupied, warm-up and unoccupied modes.

1.14.14 Description of Components

The description of components shall provide a generic description of the performance of each component. The components shall be referred to by their alpha-numeric designator.

1.14.15 Control Panel Detail

The control panel detail shall show the intended mounting location of any devices that are to be located in the control panel or on the front face of the panel. All field sensors and controls shall be connected to DDC panels to provide ease of diagnosis and repair of the system components. Control panels locations shall be shown on mechanical drawings.

1.14.16 Legends and Schedules

The legend shall provide a definition of all symbols used in the control drawings. Schedules shall provide all necessary information to clarify the operation of the components or the overall system.

1.15 TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS

Testing, adjusting, and balancing required by SECTION 15990 TESTING, ADJUSTING AND BALANCING OF HVAC SYSTEMS shall be complete, including all test and inspection reports, before starting the EMCS Field Test.

1.16 TECHNICAL SPECIFICATIONS

Government provided Corps of Engineers (UFGS) technical guide specifications (available to the Design-Build Contractor as indicated in Section 01332,DESIGN AND CONSTRUCTION DELIVERABLES/PROCEDURES) shall be completely edited and fully coordinated with the drawings to accurately and clearly identify the product and installation requirements for the facility. The specifications shall be edited in accordance with the designer notes associated with each specification and with the Specification Requirements (Division 01 General Requirement Specifications). In case of a conflict, the criteria found in the Specification Requirements (Division 01 General Requirement Specifications) shall take precedence. The provided specifications define the minimum requirements for items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals and testing that shall be provided for the facility. Where items of equipment, materials, installation, training, operating and maintenance instructions, O&M manuals or testing requirements are not specified in the provided specifications, special paragraphs within each applicable guide specification shall be prepared to specify those items. Specific items of equipment identified in the provided specifications but not required for the facility shall be edited out.

The SECTION 15951 DIRECT DIGITAL CONTROL FOR HVAC and 02556 GAS DISTRIBUTION has been edited completely for this project and is to be considered as an extension of the Specification Requirements.

1.17 ENERGY USE BUDGET (EUB) COMPLIANCE CHECK

Design energy Usage (DEU)estimates shall be calculated for the new building to verify compliance with EUB in accordance with 10 CFR, Subpart A, Part 435, ASHRAE/IESNA 90.1; and the Energy Policy Act of 1992 and 2003.

Energy Usage Budget shall be done with and without process loads. Values indicated below shall be the maximum EUB target allowed. DEU shall be less than Energy Usage (EUB) target values indicated in Table I.

Table I
Energy Usage Budget Target For This Project.

Building	Type	Region		EUB Target	Days/Week
Fire Station	H	6	**	60,000 Btuh/sq. ft./yr.	24/7

** Those buildings EUB designated with ** shall be provided using a computer-based program.

M = Million

1.17.1 Computer Simulation

The Energy Usage Budgets shall be calculated using a computer simulation. Method used must take into account the constantly changing temperatures, sun loads, etc., through a year's operation. Use of the program "BLAST" is encouraged. If "BLAST" is used, the "REVIEW SUMMARY REPORT" shall be included in the output report. Any program other than Building Load Analysis and Systems Thermodynamics "BLAST","TRANE TRACE 600",Carriers' latest version, DOE 2.1.E or BESA (Canada) requires prior approval for use. Request for use must demonstrate compliance with the following:

1.17.1.1 Acceptable Engineering Procedures

The energy analysis and building simulation will use a computer program which is based on acceptable engineering procedures. Load calculations and the systems simulation will be on an hourly basis for 12 to 365 days. Although hourly data for 365 days is preferred, a minimum of 12 model days (a statistically average day per month) is acceptable. If calculations are based on less than 365 days, the weather data selected for these days will be statistically derived.

1.17.1.2 Capable of Change

The computer program must be capable of changing the various cooling and heating loads and the thermostat settings to simulate building operations and to simulate deadband and deck/coil reset control strategies.

1.17.1.3 Cooling and Heating Loads Influencing the Building Design

The program must consider all cooling and heating loads which influence the building design. These include solar, outside air, people, lighting, equipment, etc., as well as taking into account the thermal time lag of materials.

1.17.1.4 Alternatives

Some of the alternatives that the program should be capable of analyzing include:

a. Orientation of Building.

b. Wall and roof construction and insulation.

c. Dimensions of Building.

d. Window area, solar shielding, tinted, and single or multiple glazed windows.

e. Types of fuel.

f. Central heating versus individual systems.

g. Type of equipment.

h. Type of mechanical systems, e.g., Constant/Variable volume, single zone/multizone.

i. Type of lighting systems, e.g., standard incandescent or fluorescent and low wattage, high output lighting systems.

1.17.2 NOT USED

1.17.3 Summary Report

Provide a summary section in the separate energy analysis report and results in the design analysis. Include all input data such as U values, design temperatures, hours of operation, building population and size, etc. Include output data such as distribution percentages (lighting, heating, cooling, fan, domestic water heating, etc.).

1.18 TRAINING

Training courses shall be conducted for 10 operating staff members designated by the Contracting Officer in the maintenance and operation of all mechanical systems. Two-week notice shall be given the Contracting Officer for start of training. A training day is defined as 8 hours of classroom instruction, including breaks and lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the required instruction, the Contractor shall assume that the attendees will have a high school education or equivalent, and are familiar with the systems. No training shall be scheduled until training manuals and O&M manuals have been approved by the Government. A minimum of 10 O&M manuals shall be provided for the instructions and 4 manuals for each facility shall be given to the Contracting Officer to turnover to the Fort DPW.

1.18.1 Training Course Content

The courses shall be taught at the project site for a period of 1 training day. The training courses shall cover all the material contained in the Operating and Maintenance Instructions, and O&M manuals the layout and location of each system and shall include the following for each system:

a. Troubleshooting
b. Diagnostics
c. Calibration
d. Adjustment
e. Commissioning

f. Repair procedures

(1) Typical systems and similar systems may be treated as a group, with instruction on the physical layout of one such system. The results of the performance verification tests and the calibration,adjustment and commissioning reports shall be presented as benchmarks of the system(s) performance by which to measure operation and maintenance effectiveness.

1.19 NOT USED
1.20 NOT USED

1.21 COMMISSIONING OF HVAC SYSTEMS

This section contains instructions and engineering information relating to the commissioning of HVAC systems, including the precommissioning checks and functional performance tests. Commissioning shall begin only after all work required in paragraphs entitled "Testing, Adjusting, and Balancing of HVAC Systems" and the "Temperature Controls System" have been successfully completed, and all test and inspection reports and operation and maintenance manuals required in other Section's specifications have been submitted and approved. The commissioning of HVAC systems shall meet the requirements of Technical Specification 15995 COMMISSIONING OF HVAC.

a. Pre-commissioning Checks shall be performed for each item of mechanical equipment. Deficiencies discovered during these checks shall be corrected and retested prior to start of the Functional Performance Tests.

b. Functional Performance Tests shall be performed for each equipment item. Functional performance tests shall begin only after all pre-commissioning checks have been successfully completed.

c. Commissioning of HVAC systems shall begin only after all work required in related sections, including Sections HVAC Control Systems and TAB of HVAC Systems has been successfully completed. All test and inspection reports and O&M manuals shall be submitted and approved before commissioning is conducted.

1.22 FOOD SERVICE EQUIPMENT

This section contains instructions and engineering requirements relating to the design of the Food Service Equipment. Food Service Equipment shall comply with local health standards, NSF, AGAL, and UL and shall meet the requirements of Technical Specification 11400. Design Agent shall coordinate with Section 01007 ELECTRICAL REQUIREMENTS. These are the actual equipments requirements and shall form the basis for editing of specification section 11400 FOOD SERVICE EQUIPMENT for the contract documents.

a. Not Used.
b. Not Used.

c. Kitchen Sink

Kitchen sink shall conform to requirements of NSF No. 2. Sinks shall be constructed of minimum 14-gauge stainless steel. Sink shall be double basin and provided for sprayer attachment. Faucet shall be

8-inch swivel spout with index handled lever handles and comply with NSF 61 section 9.

d. Full-Size Gas Range

Provide full-size gas range with integral oven in Kitchen. Oven to be 36 inches gas range sealed-top with six burners. Exterior finish shall be stainless steel, with 10 inches high backguard with slotted black enameled angled cap. Oven door liner, side and rear linings shall be porcelain enameled, with contoured front stainless steel plate rail. Oven shall have a minimum of four-position rack supports and shall be furnished with two racks. Oven compartment and door shall be fully insulated. Oven shall be provided with 6-inch adjustable legs. Shall be provided with six all purpose tubular heating elements, energy regulator switch controlled. With additional set of four casters. Overall dimensions 36 inches wide x 373/4 inches height x 34.36 inches deep. Power requirements 208/60/1 phase or 3 phase.

e. Undercounter Dishwashers

Provide undercounter dishwashers in Kitchen as indicated. Dishwasher to be single tank, manually fed, spray type, stationary rack, automatically controlled, electrically heated, commercial machine. The dishwasher shall be capable of handling 20 x 20 inches nominal size racks at a minimum rate of 30 racks per hour when operating with 140°F wash water temperature and 180°F final rinse water temperature. The dishwasher shall be designed for undercounter use, and be provided with labyrinth type door design. Tank wash chamber, frame, door, upper and lower spray wash and rinse assemblies, scrap collection and straining devices shall be of 18-8 304 stainless steel. Wash tank shall be filled automatically from 180°F rinse water supply. The tank shall be equipped with a built-in electric booster heater to maintain the required wash temperature as well as heating incoming water to 180°F. Tank shall have drain and overflow provisions as standard with the manufacturer. The wash, dwell and rinse cycles shall be automatic timed operation. Two minute totally automatic cycle shall include, automatic fill, automatic start, automatic pumped drain for both floor and wall drain installations. Externally mounted 3/4 hp wash pump shall be a close coupled type with stainless steel shaft ball or roller bearings, mechanical seals, stainless steel or other corrosion resisting alloy impeller, cast iron casing and shall be self-draining or equipped with means for draining. Unit shall use a maximum of 1.1 gallons of water per cycle. Provide with fresh water rinse. Dishwasher shall be provided with pressure indicating devices and indicating lights for cycle of operation all as standard with manufacturer. Furnish with one peg and one flat rack. One dish rack and one combination cup, bowl, and silverware rack shall be included, visible pressure gauge standard, manual override for extended wash and delivering purposes. Power requirements include 3/4 horsepower pump motor, 6.7 Kw electric booster; 115/60/1 phase.

1) Dishwasher Liner

A stainless steel liner with 2-3 inches overlap shall be provided to house the undercounter dishwasher.

2) Dishwasher waste piping

With this type of equipment, certain localities require the use of

cast-iron waste piping for the first 15 feet from the waste receptacle.

3) Booster Heater

The dishwasher shall be provided with a built-in booster heater capable of raising the supply temperature from 140 to 180°F during continuous operation of the dishwasher.

f. Kitchen Canopy Exhaust Hood (NFPA 96 TYPE I)

Kitchen cooking vapors are exhausted through an exhaust hood equipped with grease extracting baffles, automatic grease wash down, or an approved fire extinguishing system or a water spray fire protection system (See Section 01008 FIRE PROTECTION and specification section 11400). Hood shall not be part of a gas fired rooftop Kitchen make-up air system. Items served by the Kitchen canopy are the range. Hoods shall be constructed of 18-gauge stainless-steel. Make-up air supplied to the hood must shutdown in accordance with NFPA 96 and section 01007 ELECTRICAL REQUIREMENTS including the following:

1) Shut-trip electrical power to cook-top range.
2) Shut off all make-up air to hood.
3) Notify Fire Alarm System of alarm condition.

Dry Chemical fire suppression systems are no longer approved or listed, for protecting Kitchen hood systems and cooking equipment. Where required use pre-engineered wet chemical fire extinguishing systems and include in section 11400 KITCHEN EQUIPMENT REQUIREMENTS. A fire-actuated 286°F damper shall be installed in supply air plenum at each point where a supply air duct inlet or a supply air outlet penetrates the continuously welded shell of the assembly. The damper shall be listed for such use or be part of a listed exhaust hood with or without exhaust dampers.

A. Alternative: The fire extinguishing system can be eliminated from the grease removal, hood and duct system, if the cooking equipment is served by a fire-actuated water system listed to extinguish fire in the grease removal, hood and duct system. These systems are usually provided as part of the grease extractor wash down system.

B. Alternative: Wet chemical fire extinguishing system can be specified to protect all components of the kitchen exhaust system including the duct system. If the wet chemical fire extinguishing system is listed for unlimited duct length protection, protection of duct system is usually accomplished by providing a nozzle in the duct throat only, downstream of the grease extractor. Activation of this nozzle or the water system acts to extinguish the fire in the duct. When fire extinguishing systems are activated, exhaust should remain on. Make-up air supplied to the hood must be shut-off per NFPA 96 and section 01007 ELECTRICAL REQUIREMENTS.

C. Kitchen Ductwork

Shall be in accordance with section 11400A and latest NFPA 96. Per NFPA 96 exhaust duct shall lead as directly as is practical to the exterior of the building, so as to not unduly increase any fire hazard. Ducts shall also have a clearance of at least 18 inches to combustible material. Exhaust ducts must be provided with access openings at all changes of direction and at 12 foot intervals, for cleaning and inspection purposes.

g. Backflow Preventors

Each item of food equipment having water supply and water connection with the water inlet connected below the flood level of the equipment, shall be supplied with a backflow preventor of size and proportions that will allow an ample flow of water to the equipment, but will prevent backflow of waste or polluted water into the water supply system.

h. Plumbing

Plumbing shall be provided as required by Technical Guide Specification 15400 PLUMBING, GENERAL PURPOSE, and herein required. High temperature or chemical rinse may require special (acid-resisting) piping.

1.23 EMERGENCY GENERATOR

a. Generator Set. Guidance contained herein addresses the engine and its accessories while guidance on the generator and its accessories is given in the section 01007 ELECTRICAL REQUIREMENTS.

1) Fuel Oil System. The design and installation of fuel oil systems shall conform to NFPA No. 31 and NFPA No. 37.

2) Day Tank. Shall have a capacity for 4 hours of fuel.

3) Fuel Oil Tank. Aboveground tank(s) shall be provided that are double wall, provided with leak and spill containment and leak detection conforming to Federal and local regulations. Piping shall be double walled with leak detection to meet all Federal and Local regulations including 40 CFR 112.7.

b. Back-up Fuel Supply. Provide enough fuel (tank size) for 24 hours of full load operation.

1.24 LIFE CYCLE COST ANALYSIS (LCAA)

The following LCCA shall be provided if the Contractor considers high efficiency boilers, water-cooled chillers for building systems, high efficient building envelope, desiccant pre-cooling of building air handling units or Photovoltaic lighting systems and shall be provided if proved to be the least life cycle cost effective

1) HVAC systems (high efficiency boilers, water-cooled chillers for building cooling).
2) High efficient Building envelope.
3) Photovoltaic Lighting.
4) Desiccant pre-cooling of all building air handling units in accordance with section 15500A DESICCANT COOLING SYSTEMS.
5) To ensure proper ventilation air requirements and ventilation effectiveness of 0.9 per ASHRAE 129 are provided the dorm room side of the building consider single zone air handling unit for makeup air to the kitchen and toilet areas versus VAV air handling unit.
6) Reduce water use by an additional 20% by using ultra low flow show heads, ultra low flow faucets and dual flush water closets and waterless urinals.
7) Geothermal heat pumps.
8) Heat recovery bundle on water cooled economizer for chillers.

a. LCCA calculations and reports will be performed in accordance with WinLCCID. Computer calculations will be performed using the LCCA computer program, which conforms to WinLCCID an 10 CFR 436. Computer calculations will be performed using the LCCA computer program, using methods required for Energy Use Compliance see paragraph ENERGY USE BUDGET (EUB) COMPLIANCE CHECK. The energy to be considered will include all known thermal loads including process, ventilation and occupant loads. Operating hours will be those actually anticipated for operation. The design team will consider and evaluate all design alternatives that are feasible and appropriate for the particular design application under consideration required in other paragraphs of this Section. Special attention will be given to ensure that all feasible energy and water conservation alternatives are included in the analysis, as indicated. For each analysis the alternative with the lowest LCCA will be incorporated into the design. All economic analyses will use the energy price calculation rates furnished under Energy Prices and Discount Factors for Life-Cycle Cost Analysis. During periods of rapid change in fuel prices the average local fuel price for the previous 12 months period should be used in the analysis in lieu of the current contract price. In lieu of performing project specific individual economic studies, the designer may select alternatives on the basis of previous economic analyses or generic studies provided these studies are applicable to the project under design. In all cases, the essential elements of the design selection process including, as a minimum, the basis for which the list of feasible alternatives was developed and the basis upon which the various design decisions were reached, will be documented in the design analysis and retained in the project file. Only requested LCCA's in paragraph of this section shall be considered. Future energy values shall be based on inflation and escalation over a 25 year period in accordance with the WinLCCID USACERL program.

PART 2 NOT USED

PART 3 NOT USED

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330

SUBMITTAL PROCEDURES

09/01; Omaha Update 07/02

-- End of Section Table of Contents --

SECTION 01330

SUBMITTAL PROCEDURES
09/01; Omaha Update 07/02

PART 1 GENERAL

Attachments: Submittal Register
ENG Form 4025, Transmittal Form

1.1 SUMMARY

This section includes administrative and procedural requirements for construction submittals presented by the Contractor after 100% corrected plans and specifications have been accepted by the government. This section also includes requirements for developing, submitting and maintaining a "Submittal Register".

1.2 CONTRACTOR RESPONSIBILITIES

The Contractor is responsible for total management of his work including approval, scheduling, control, and certification of all submittals. The submittal management system provided in these specifications is intended to be a complete system for the Contractor to use to control the quality of materials, equipment and workmanship provided by manufacturers, fabricators, suppliers and subcontractors. The Contractor shall review each submittal for contract compliance. The Submittal Register (ENG Form 4288) will be utilized to log and monitor all submittal activities. No construction or installation activities shall be performed prior to required approvals and Government compliance reviews of applicable submittals. The Contractor shall perform a check to assure that all materials and/or equipment have been tested, submitted and approved during the preparatory phase of quality control inspections. The Contractor shall coordinate all submittals with the Contractor's Designer (A-E). Approval by the Contractor's Designer means that the submittal is in compliance with the Construction Set design submittal.

1.3 SUBMITTAL IDENTIFICATION (SD)

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

In addition, the following items are included:

Permits

SD-02 Shop Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accordance with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily checklists

Final acceptance test and operational test procedure

SD-07 Certificates

A document, required of the Contractor, or through the Contractor, from a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

Statement signed by an official authorized to certify on behalf of the manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of the contract, must state the Contractor's name and address, must name the project and location, and must list the specific requirements which are being certified.

Confined space entry permits.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

Factory test reports.

SD-10 Operation and Maintenance Data

Data intended to be incorporated in operations and maintenance manuals.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

In addition, the following items are included:

As-built drawings

Special warranties

Posted operating instructions

Training plan

1.4 SUBMITTAL CLASSIFICATION

Unless directed otherwise, the words "Government Approval" associated with "G"-designated submittals shall be interpreted in the context of the below defined submittal types. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," all G-DO and G-AO submittals are considered to be "shop drawings".

Submittals are classified as follows:

1.4.1 Government Reviewed Design During Construction Submittals (G-DO)

"G-DO" submittals are those that involve 1)extensions of design for design work performed by the Construction Contractor not previously included in the completed design Construction drawings and require a conformance review by the Government, and 2) "Revisions to the Accepted Design" and require acceptance by the Government in accordance with the below paragraph titled "Supplemental Design Submittals".

These submittals shall be reviewed and approved by the Contractor's Quality Control Representative and the Contractor's Designer of the responsible design organization, prior to submittal to the Government for conformance review. Conformance review only checks for compliance with the RFP solicitation requirements. Conformance review of "G-DO" submittals or lack thereof by the Government does not relieve the Contractor of its responsibility for the design and construction. Government review will not include development of design calculations or other means of determining adequacy of design. The Contractor and his designer retains the sole responsibility for adequacy of design.

The below listed "G-DO" submittals require a conformance review by the Government, unless previously included in completed design.

G-DO Type submittals:

1. Fire Suppression Systems defined in sections 13930, 13935, and other sections related to fire suppression that are required by the contract.

SD-02 Shop Drawings:
   Shop Drawings
SD-03 Product Data:
   Fire Protection Related Submittals
   Sway Bracing
   Materials and Equipment
   Hydraulic Calculations
   Spare Parts
   Fire Protection Specialist

2. Fire Detection Systems defined in sections 13850, 13851, and other sections related to fire detection that are required by the contract.

SD-02 Shop Drawings:
   Fire Alarm Reporting System
SD-03 Product Data:
   Storage Batteries
   Voltage Drop
   Special Tools and Spare Parts
   Technical Data and Computer Software

3. HVAC Controls defined in sections 15950, 15951, and other sections related to HVAC controls that are required by the contract.

SD-02 Shop Drawings:
   HVAC Control System
SD-03 Product Data:
   Service Organizations
   Equipment Compliance Booklet

1.4.2 Government Reviewed Construction Submittals ("G-AO")

"G-AO" submittals are those that need to be reviewed for conformance to the contract by either the Area or Resident Office (as directed) and other items as designated by the Contracting Officer's Representative. All "G-AO" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and the Contractor's Designer prior to submittal to the Government. Conformance review only checks for compliance with the RFP solicitation requirements. Conformance review of "G-AO" submittals or lack thereof by the Government does not relieve the Contractor of its responsibility for the design and construction. Typical G-AO submittals are listed below.

· All Testing, Adjusting, and Balancing (TAB) submittals
· All System type testing procedures and acceptance reports (e.g., Fire Detection, Fire Protection, Security/Communication Systems, etc.)
· All O&M Manuals
· Other final operational type submittals such as Spare Parts Data, Framed Instructions, Warranty Information, etc.
· Training plans and schedules for Systems Training

1.4.3 Information Only (FIO)

All "FIO" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and the Contractor's Designer prior to submittal to the Government. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above. The Contracting Officer has the option to review any submittal but these submittals do not require conformance review by the Government.

Listed below are typical examples of FIO submittals. This list is not all inclusive of all FIO submittals.

1. Structural steel
2. Lawn irrigation systems
3. Concrete reinforcement
4. Millwork/casework
5. Masonry reinforcement
6. Interior signage
7. Cathodic protection
8. Asbestos abatement layouts
9. Security systems
10. Interior / Exterior Finishes
11. Furniture Systems
12. Pavement Concrete mix designs (special use - non routine, e.g., Airfield Paving)
13. Asphalt mix designs (special use - non routine, e.g., Airfield Paving)
14. Finish samples for major finishes

NOTE: "FIO" IS ANY SUBMITTAL ITEM THAT DOES NOT HAVE A "G-DO" OR "G-AO" CLASSIFICATION.

1.4.4 Administrative Submittals

The submittal items listed below are not to be included on the Submittal Register (as discussed below). Unless directed otherwise by the Contracting Officer, the following administrative submittals shall be submitted to the Area or Resident (as directed) Office, for approval, via a

Serial Letter: Quality Control Plans (Section 01451A CONTRACTOR QUALITY CONTROL), Accident Prevention Plans (Section 01400 SPECIAL SAFETY REQUIREMENTS, Revisions to Environmental Protection Plans (Section 01355 ENVIRONMENTAL PROTECTION) and other submittals as directed by the Contracting Officer. Format for the Serial Letter shall be as directed by the Area or Resident Office. Submittals provided by Serial Letter shall be provided to the Area or Resident Office as directed.

1.4.5 Supplemental Design Submittals

If revisions to the accepted design (Construction Set) become necessary, the contractor shall submit a supplemental design package and the revisions will be considered a "Variation". The Contractor shall submit this Supplemental Design Package as a construction submittal in accordance with the below paragraph titled "Variations".

1.5 GOVERNMENT REVIEWED SUBMITTALS

The Contracting Officer's review of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information appear to meet the Solicitation requirements. Government Review will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Design and CQC requirements of this contract is responsible for design, compliance with design criteria required in the solicitation, dimensions, all design extensions, such as the design of adequate connections and details, etc. and the satisfactory construction of all work. After submittals have been reviewed for conformance or approval, as applicable, by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.6 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer, obtain the Contractor's Designer approval and Government review, or approval, when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Any submittal found to contain errors or unapproved variations from the solicitation or accepted proposal, shall be resubmitted. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.7 WITHHOLDING OF PAYMENT

No Payment for materials incorporated in the work will be made if all required Designer or Contractor Quality Control Representative approvals or required Government conformance reviews, or appprovals, as applicable, have not been obtained. No payment will be made for any materials incorporated in the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.8 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in

the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. The Contractor's Quality Control (CQC) representative and the Designer shall check, approve and stamp, sign, and date each item, indicating action taken. Proposed variations from the solicitation (contract requirements)or accepted 100% corrected design shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring conformance review or approval by the Government shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

1.9 SUBMITTAL REGISTER AND ENG FORM 4288 (RMS) SUBMITTAL REGISTER

The Contractor's Designer(s) shall develop a complete list of required construction submittals as part of the 100% Corrected Design Documents as outlined in RFP Section 01332, DESIGN AND CONSTRUCTION DELIVERABLES/PROCEDURES. Additionally, using the Government's Resident Management System (RMS) software, the Government will generate from the design SpecsIntact file, a ENG Form 4288 Submittal Register for govenrment use in tracking the construction submittals. The Contractor shall use the Government-generated submittal register from RMS to track submittal requirements. Much of the same information contained on the Contractor generated submittal register will be included on the ENG Form 4288 (RMS). The Contractor will be furnished one (1) set of ENG Forms 4288 (RMS) at the preconstruction conference on which will be listed each item of equipment and material of each type for which fabricators' drawings, and/or related descriptive data, test reports, samples, spare parts lists, O&M manuals, or other types of submittals are required by the completed project specifications. The Contractor shall complete the appropriate columns as indicated on the attached ENG Form 4288 (RMS) Instructions and return to the Area or Resident Office the specified number of completed copies for acceptance within 20 calendar days after the preconstruction conference.

Upon acceptance of the ENG Form 4288 (RMS) by the Contracting Officer, the Contractor shall maintain this ENG Form 4288 (RMS) for the project in accordance with the attached ENG Form 4288 (RMS) Instructions, and the ENG Form 4288 (RMS) will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. The ENG Form 4288 (RMS) ACTIVITY NO. is filled in when a network analysis system is a contract requirement. The TRANSMITTAL NO. and ITEM NO. shall be left blank and used later to record the respective transmittal and item number corresponding to those listed on the transmittal form entitled: "TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE" (ENG Form 4025). The approved ENG Form 4288 (RMS) will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated. Updates to the submittal register showing the Contractor action codes and actual dates shall be submitted monthly or until all submittals have been satisfactorily completed. When the progress schedule is revised, the ENG Form 4288 (RMS) shall also be revised and both submitted for approval.

1.10 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 20 calendar days exclusive of mailing time) shall be allowed and shown on the register for conformance reviews by the Contracting Officer for submittals requiring Government review and for submittals which vary from the solicitation or accepted 100% corrected design. No delay damages or time extensions will be allowed for time lost in late submittals.

1.11 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting all submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

1.12 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

1.12.1 "G-DO" Submittals

All "G-DO" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Contractor's Designer prior to submittal to the Government. A conformance review is required by the Government on all "G-DO" submittals, prior to construction of the related items.

Except as noted below, all items listed as "G-DO" Submittals in the various sections or on the Submittal Register shall be submitted in eight (8) copies. Seven (7) of the eight (8) copies shall be mailed directly to the addressee shown below using the transmittal form.

Technical Reviewer
Engineering Division (ED)
Attn: CENWO-ED-DI
U.S. Army Engineer District, Omaha
106 South 15th Street
Omaha, NE 68102-1618

The remaining one (1) copy shall be submitted to the Area Engineer using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed), accompanied by eight (8) copies of the transmittal form.

Each required submittal, which is in the form of a drawing, shall be submitted as eight (8) prints of the drawing. Drawing prints shall be either blue or black line permanent-type prints on a white background or blueprint and shall be sufficiently clear and suitable for making legible copies.

Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment which is provided. Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function as a unit.

An additional copy of submittals related to fire protection/detection systems shall be submitted concurrently to the Base Civil Engineering or Post DPW Office. The mailing address for these submittals shall be obtained at the preconstruction conference.

1.12.2 "G-AO" and FIO Submittals

Except as noted below, data for all items listed as "G-AO" Submittals in the various sections shall be submitted in five (5) copies. All five copies shall be submitted to the Area Engineer for solicitation conformance review using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed) accompanied by five (5) copies of the transmittal form.

Except as noted below, data for all items listed as "FIO" Submittals in the various sections shall be submitted in three (3) copies. All three copies shall be submitted to the Area Engineer using the transmittal form. Items not to be submitted in multiples, such as samples and test cylinders, shall be submitted to the Area or Resident Engineer (as directed) accompanied by three (3) copies of the transmittal form.

All "G-AO" and "FIO" submittals shall be reviewed and approved by the Contractor's Quality Control Representative and Contractor's Designer prior to submittal to the Government. A completed Government conformance review is required on all "G-AO" submittals, prior to construction of the related items.

The Government has the option to review any For Information Only submittals.

1.12.3 Certificates of Compliance

Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

1.12.4 Purchase Orders

Copies of purchase orders shall be furnished to the Contracting Officer when the Contractor requests assistance for expediting deliveries of equipment or materials, or when requested by the Contracting Officer for the purpose of quality assurance review. Each purchase order issued by the Contractor or his subcontractors for materials and equipment to be

incorporated into the project shall (1) be clearly identified with the applicable DA contract number, (2) carry an identifying number, (3) be in sufficient detail to identify the material being purchased, (4) indicate a definite delivery date, and (5) display the DMS priority rating, if applicable.

1.12.5 Operation and Maintenance Instructions and/or Manuals

Where required by various technical sections, operations and maintenance instructions and/or manuals with parts lists included shall be provided by the Contractor in quintuplicate, unless otherwise specified, and shall be assembled in three-ring binders with index and tabbed section divider and having a cover indicating the contents by equipment or system name and project title and shall be submitted to the Area Engineer for approval (after approval by the Contractor's Quality Control Representative), 90 days prior to final tests of mechanical and electrical systems, unless otherwise specified. Each operation and maintenance manual shall contain a copy of all warranties. If field testing requires these copies to be revised, they shall be updated and resubmitted for review within 10 calendar days after completion of tests. [The Operations and Maintenance Instructions and/or Manuals shall be shown as a separate activity on the Contractor prepared construction schedule bar chart or network analysis system.] [In additon, one reproducible unfolded copy of all wiring and control diagrams and approved system layout drawings shall be submitted with the O&M Manuals.]

1.12.6 Interior/Exterior Finish Sample and Data

All submittals regarding color boards (Section 09915 COLOR SCHEDULE) for interior finish samples and data shall be submitted concurrently and all submittals for exterior finish samples and data shall be submitted concurrently. These color boards are in addition to the samples required under the specfic technical specifications listed as "samples".

1.13 VARIATIONS

1.13.1 Necessity and Documentation of Variations

If revisions to the accepted design (Construction Set) become necessary, the contractor shall submit a supplemental design package using the "Supplemental Design Certification and Transmittal Form" that was included in the Request For Proposal, Section 01332 DESIGN AND CONSTRUCTION DELIVERABLES/PROCEDURES. The revisions will be considered a "Variation" and the list of deviations from the accepted design shall be outlined on the Design Certification form. Variations from the Construction Set must be approved by the Contractor's Designer, and Contractor's Quality Control Representative and accepted by the Contracting Officer. The contractor shall set forth in writing the reason for any variations and clearly annotate such variations on the supplemental design. The narrative shall include documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Government. The supplemental design submittal shall include drawings, specifications, design analysis and calculations necessary to establish that the proposed revision satisfies the contract requirements.

1.13.2 Submittal Procedure for Variations

The Contractor shall submit this Supplemental Design Package as a

construction submittal, type G-DO as previously outlined herein, and shall check the "Variation" column (column 'h') of ENG Form 4025-R. The contractor shall distribute this submittal package (ENG Form 4025-R, completed Supplemental Design Certification, and supporting documentation) as a construction submittal and submit this package with the following identification:

Specification Section: 01451A, Contractor Quality Control
Item Number (column 'a'): *insert appropriate number of design revision*
Description of Item (column 'b'): "Revision to Accepted Design - *State topic*"

Because management of the design is a Quality Control issue and may affect numerous technical guide specifications, these items shall be submitted as a new submittal item under Section 01451A CONTRACTOR QUALITY CONTROL.

For example, "Item 3: Revision to Accepted Design - Louvers", would be the third revision to the accepted design and relates to "Louvers".

1.13.3 Rights and Responsibilities Associated with Variations

When submitting a variation for acceptance, the Contractor warrants that the contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of the work. The Contractor shall take actions and bear the additional costs, including review costs by the Government, necessary due to the proposed variation. In addition to the submittal review period allowed elsewhere herein, the Contractor shall allow an additional ten (10) working days for consideration by the Government. The Government reserves the right to rescind inadvertent action codes of submittals containing unnoted variations that have not been submitted as a Supplemental Design Submittal with the accompanying Supplemental Design Certification.

1.14 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

1.15 FINAL COPY OF "G-DO" AND "G-AO" SUBMITTALS

Upon completion of review of submittals requiring Government acceptance, conformance review, or approval, the submittals will be identified as having received satisfactory review by being so stamped and dated.

1.15.1 "G-DO" Submittals

Two (2) copies of "G-DO" submittals, for acceptance and/or conformance review by the Government, will be returned to the Contractor, except for samples, test cylinders, and O&M manuals for which two (2) copies of the transmittal form only will be returned to the Contractor. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract.

1.15.2 "G-AO" Submittals

Two (2) copies of "G-AO" submittals for conformance review will be returned to the Contractor except for samples, test cylinders, and O&M manuals for

which two (2) copies of the transmittal form only will be returned to the Contractor.

1.16 FINAL COPY OF INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.17 STAMPS

Stamps used by the Contractor's Designer and the Contractor's designated Quality Control person on the submittal data to certify that the submittal meets contract requirements shall be similar to the following (use two stamps for submittals reviewed by both):

CONTRACTOR

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

INSTRUCTIONS
ENG FORM 4288 (RMS)

1. The Contractor shall utilize the ENG Form 4288 (RMS) generated by the Government Residential Management System (RMS)software for tracking construction submittals. The Submittal Register information, columns (c) thru (f) from the Contractor generated Submittal Register, [will be utilized by the Government] to generate the ENG Form 4288 (RMS). [The Government will furnish the Contractor a hard copy of the ENG Form 4288 (RMS) at the preconstruction conference.]. The ENG Form 4288 (RMS) includes the following items and parties responsible for completing the information required on the ENG Form 4288 (RMS). The subparagraph headings below do not correspond to the Submittal Register column headings.

a. Activity Number: will be provided by the Contractor from his Network Analysis, if required, and when a network analysis is accepted.

b. Transmittal Number and Item Number: will be provided by the Contractor from ENG Form 4025 for each item.

c. Specification Paragraph Number: will be provided by the Contractor from the Submittal Register from column entitled "Specification Paragraph Number".

d. Description of Submittal: will be provided by the Contractor from the Submittal Register from column entitled "Description of Item Submitted".

e. Type of Submittal: will be provided by the Contractor from the Submittal Register from column entitled "Type of Submittal" or "Description of Item Submitted".

f. Classification: will be provided by the Contractor from the Submittal Register from column entitled "Classification".

g. Reviewing Office - Reviewer: will be provided by the Contractor from the Submittal Register from column entitled "Classification" or "Reviewer".

h. Contractor Schedule Dates: the Contractor will provide schedule dates for

"Submit Needed By" (Date the Contractor expects to submit an item. It is the Contractors responsibility to calculate the lead time needed for the government approval. Note if resubmittal is required it is the Contractors responsibility to make all adjustments necessary to meet the contract completion date.)

"Approval Needed By" (date the Contractor can receive approval and still obtain the material by need date.), and

"Material Needed By" (date that the material is needed at the site. If there is a network analysis it should reflect that date on the analysis.)

i. Contractor Action: Includes the following items: "Code" and "Submit to the Corps". These items will be completed by the Contractor and/or Contractor's Designer. The action codes will be one of the following:

A - Approved as submitted.

B - Approved, except as noted.
G - Other (specify)

j. Government Action: This item includes a Government Action "Code" and "Date" and is reserved for Government use. The Government reserves the right to review any submittal for contract compliance. Receipt of an Action Code "F - Receipt Acknowledged" or failure of the Contractor to receive an Action Code by the Government, does not mean that the submittal is in compliance with the contract requirements. For this design-build soclicitaion, unless noted otherwise by the Contracting Officer, the Action Codes for this form, when used by the Government, will be one of the following:

A - Reviewed for conformance. No except taken
B - Reviewed for conformance. Exceptions as noted.
C - Reviewed for conformance. Exceptions as noted. Refer to attached ____ sheet resubmission required.
D - Will be returned by separate correspondence.
E - Reviewed. Does not comply (See Attached). Resubmission required.
F - Receipt Acknowledged.
Fx - Receipt acknowledged, does not comply as noted with contract requirements.
G - Other (specify).

2. Reviewer Abbreviation code will be as follows;

G-DO - Approved by Contractor's Designer, Contractor's Quality Control Representative and Acceptance or Conformance Review by the Government, as applicable. Approval by the Contractor's Designer means that the submittal complies with Construction Set design submittal or meets the requirements of a "Variation".

G-AO - Approved by Contracor's Quality Control Representative and Designer and conformance review by the Government.

For Information Only - All other submittals without a G-AO or G-DO abbreviation code, Approved by Contractors Quality Control Representative and/or Designer. The Government reserves the right review any submittal for conformance with the solicitation.

INSTRUCTIONS
ENG FORM 4025

1. DATE at the top of form will be the date submitted to the DOR which is to be completed by the Contractor.

2. TRANSMITTAL NO. Each new transmittal (i.e. [G-AE, G-AO or FIO) shall be numbered consecutively for each specification section in the space provided in "Transmittal No.". This number will be the identifying symbol for each submittal. Example: "15400A-001", "15895A-001" "15895A-002", "16415A-001", etc. For each new submittal or for a resubmittal, the appropriate box must be marked. Resubmittals must be designated by their original sequential number followed by an ".1", ".2", etc. for each sequential resubmittal. Example: "15895A-001.1" (previous submittal No. 15895A-001).

3. TO: Box will contain the name and address of the office which will review the submittal (as designated by the Contracting Officer).

4. FROM: Box will be the name and address of the Contractor. Contractor is to complete this box.

5. CONTRACT NO. box will contain the Contractors construction contract number (e.g., DACXXX-XX-C-XXXX).

6. CHECK ONE box

a. CHECK ONE box (for transmittal/ retransmittal) will be completed by the Contractor with one box marked. If a resubmittal is provided last transmittal number will be added.

b. CHECK ONE box will be completed by the Contractor with one box marked for the submittal type.

7. SPECIFICATION SECTION NO. box will be completed by the Contractor. The number will be the five digit number found in the specifications. No more than one section will be covered with each transmittal.

8. PROJECT TITLE AND LOCATION box will be completed by the Contractor.

9. Column a, will be completed by the Contractor and will contain a different number for each item submitted in that transmittal. Once a number is assigned to an item it will remain the same even if there is a resubmittal.

10. Column b, will be completed by the Contractor. The description of each item on this form will be the descriptions provided on the submittal register. The Contractor shall submit each submittal register item all at once on one transmittal if possible. If a submittal register item can not be submitted all at once Contractor should note that in the remarks box.

11. Column c, will be completed by the Contractor. The information will be the appropriate submittal description number as described this Section or shown on the submittal register (e.g. SD-XX).

12. Column d, will be completed by the Contractor. The number of copies will be determined by the Contractor after review of submittal register for the classification of the item and after review of paragraph: SUBMITTAL PROCEDURES of this Section.

13. Column e, will be completed by the Contractor. The Contractor shall state all applicable paragraph numbers.

14. Column f, will be completed by the Contractor. The Contractor shall state all applicable drawing sheet numbers.

15. Column g, will be completed by the Contractor and/or Contractor's Designer. The action codes will be one of the following:

A - Approved as submitted.
B - Approved, except as noted.
G - Other (specify)

16. Column h, will be completely by the Contractor. A check shall be placed in this column when a submittal is not in accordance with the plans and specifications also, a written statement to that effect shall be included in the space provided for "Remarks".

17. Column i, is reserved for Government use and may or may not be provided. For this design-build soclicitaion, unless noted otherwise by the Contracting Officer, the Action Codes for this form, when used by the Government, will be one of the following:

A - Reviewed for conformance. No except taken.
B - Reviewed for conformance. Exceptions as noted.
C - Reviewed for conformance. Exceptions as noted. Refer to attached ____ sheet resubmission required.
D - Will be returned by separate correspondence.
E - Reviewed. Does not comply (See Attached). Resubmission required.
F - Receipt Acknowledged.
Fx - Receipt acknowledged, does not comply as noted with contract requirements.
G - Other (specify).

18. REMARKS box self explained.

19. Contractor Quality Control Manager must provide name and sign all Eng Form 4025 certifying conformance. In the space for the name and signature, also include a phone number where the CQC Manager may be reached.

20. Section II will be completed by the Contractor, unless approval is required by the Government.

See reverse side of ENG Form 4025 for additional instructions.

-- End of Section --

Attachment B - SUPPLEMENTAL DESIGN CERTIFICATION AND TRANSMITTAL FORM

[Contractor's Letterhead]

[Date: _____]
[Contract No. _____]

[Reviewing Component Address]

Subj: SUPPLEMENTAL DESIGN CERTIFICATION AND TRANSMITTAL FORM
[Project Title _____]
[Project Location _____]
[Contract No. _____]

Gentlemen

The supplemental design items listed below and the attached documents, unless identified otherwise, I hereby certify are in compliance with the RFP requirements of the subject construction contract and are compatible with other elements of work, subject to Government conformance review:

1. Nature and Features of the Design Variation(s):

2. Why the each Design Variation is desirable and Beneficial to the Government:

3. List of any additional Deviations from the RFP:

4. List of Specific Documents Supporting Design Variation(s):

a. Design Drawings

(1) Sketches:
(2) Reissued Drawings:
(3) Descriptive Changes:

b. Project Specification

(1) Reissued or New Sections:
(2) Descriptive Changes:

c. Design Analysis

(1) Reissued Pages:
(2) Reissued or New Calculations:

d. Any other Design Deliverable:

[Typed Name and Signature of an Officer of the Contractor's Company]

Copy to:

[As standard with the Contractor]

ATTACHMENT C SAMPLE SUBMITTAL PARAGRAPH

The below listing is an example of a typical submittal paragraph as it may appear within the technical guide specifications and with the appropriate text for the submittal review designations, G-DO, G-AO, or FIO (blank).

1.4_ SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fire Sprinkler Design Drawings; G-DO

SD-03 Product Data

Meters

Regulators

SD-08 Manufacturer's Instructions

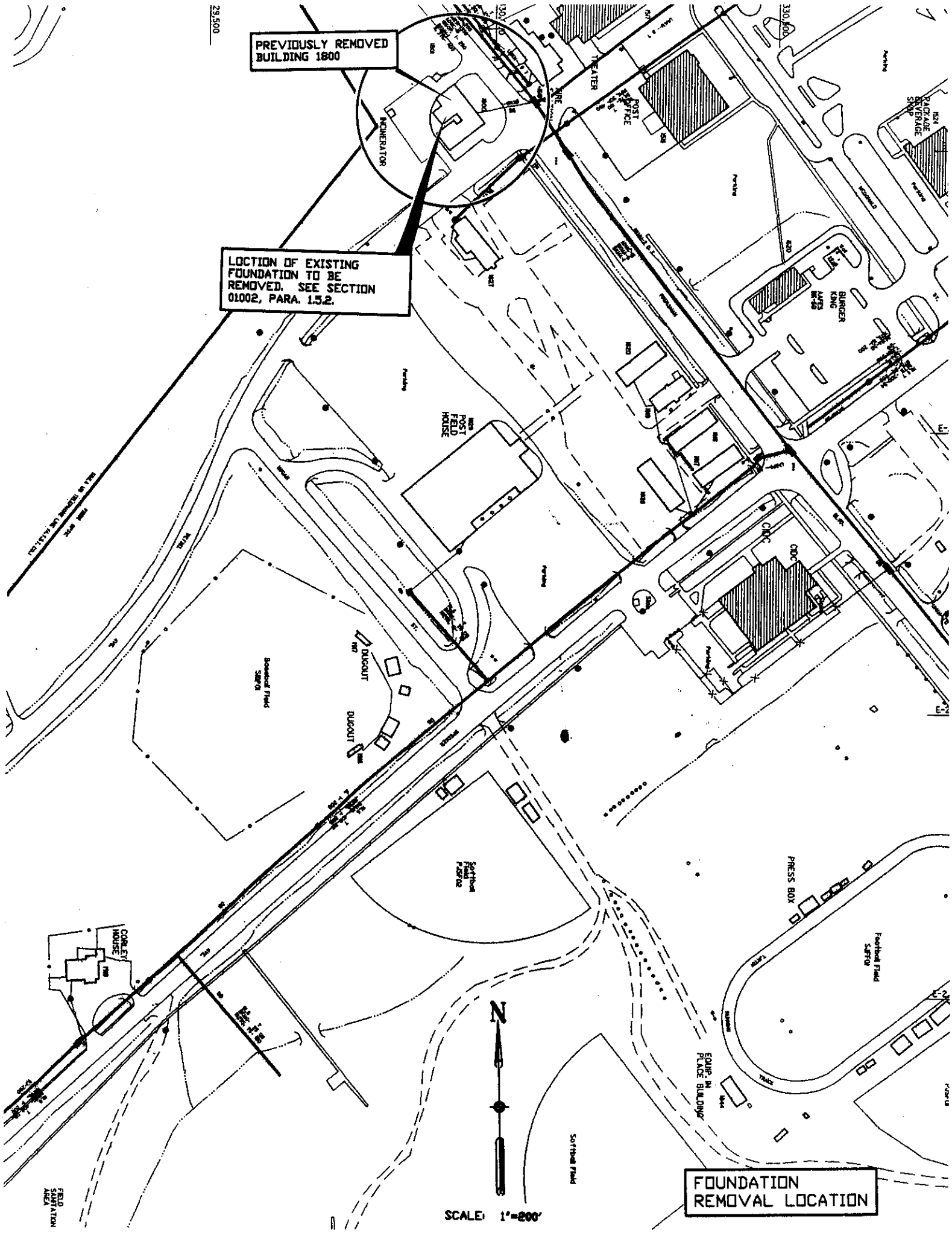
Dielectric Unions

Pressure Reducing Valves

SD-10 Operation and Maintenance Data

Wet Pipe Sprinkler System; G-AO

-- End of Section --


PREVIOUSLY REMOVED BUILDING 1800
LOCTION OF EXISTING FOUNDATION TO BE REMOVED. SEE SECTION 01002, PARA. 1.5.2.
INCINERATOR
THEATER
POST OFFICE
BURGER KING
POST FIELD HOUSE
CDC
DUGOUT
DUGOUT
Softball Field
CORLEY HOUSE
PRESS BOX
Football Field
EQUIP. IN PLACE BUILDING
Softball Field
FIELD SANITATION AREA
N
SCALE: 1"=200'
FOUNDATION REMOVAL LOCATION